THE IRON TRADE REVIEW

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NEW RECORDS

IN PIG IRON PRODUCTION FOR HALF YEAR

And Iron Ore Shipments for Month—Markets Generally Dull—Prices of Plates and Shapes Sagging.

Owing in part at least to the interruption of the holiday, there has been less life in the market during the last few days, and very few transactions of importance have been recorded. There is a general tendency toward lower prices in pig iron and nearly all finished materials.

Iron Ore Shipments

The month of June made a new record in the Lake Superior region, the total being 7,316,769 tons, an increase of 123,480 tons over the previous record month of August, 1909, and exceeding by nearly 2,000,000 tons the record of June of last year. This record is the more remarkable on account of the fact that many vessels have been out of commission on account of inability to get cargoes. At the present rate it would be very easy to ship more than 50,000,000 tons during the season. The question is whether demand will justify such an immense movement.

Pig Iron Production

The first half of 1910 has made a new record in production of coke and anthracite pig iron, the total being 14,761,264 tons, an increase of a million and a half over the wonderful production for the first half of 1907. The production for June was 2,291,094 tons, a reduction of only 83,708 tons compared with May. The average daily production in June was 76,369 tons, or only 238 tons less than in May. The list of active stacks shows a loss of eight, but since July 1, five stacks have been blown out, and it is expected that a number of others will become inactive at an early date. It does not seem probable that during the second half of the year such a large tonnage will be manufactured as during the past six months, and a sharp decrease is greatly to be desired under present market conditions.

Pig Iron Is Dull

In all parts of the country come reports of a lifeless pig iron market, and in some places there is decided weakness. Some very low quotations have recently been made on basic in the east, and new low levels have been touched in the valleys, where as low as $14.10 at the furnace for No. 2 foundry has been done.

Shapes and Plates

On shapes and plates, there is increasing irregularity in prices, and the demand is not active. The principal contract of the week was for bridge and viaduct work on an 83-mile extension of the Western Maryland railroad, requiring 12,000 tons, awarded to the McClintic-Marshall Construction Co. The contract for the National Carbon Co.'s plant at Niagara Falls, 1,300 tons, was awarded to T. H. Brooks & Co., Cleveland. The contract for the company's smaller plant at Fremont, O., went to the Riverside Bridge Co. Barber & Ross will fabricate 1,000 tons of Bethlehem sections for buildings of the Washington Investment Co. and the Washington Hotel Co., at the national capital. C. G. Patterson, New York, has been awarded 1,000 tons, part of the requirements for the Daniels & Fisher building, Denver. The Potomac River Steamship Co. has awarded two boats, requiring 4,000 tons of plates and shapes, to the Newport News Shipbuilding & Dry Dock Co., which has also taken an order for two steel steamships requiring 4,500 tons for the New York & Porto Rico Steamship Co. The Carnegie Steel Co. will furnish 2,500 tons of material for a car ferry for the Ann Arbor railroad, to be built by the Toledo Shipbuilding Co.

Railroad Buying

Railroad buying is not heavy. The Pennsylvania railroad has ordered four steel car floats and a steel ferry. The Tennessee Coal, Iron & Railroad Co. has sold 11,000 tons of open-hearth rails to the San Antonio & Arkansas Pass railroad, and 300 tons scattering. The Carnegie Steel Co. has sold 700 tons to the Elkins Electric Railway Co. The Wheeling & Lake Erie railroad has purchased 1,200 tons of rails from the Carnegie Steel Co., and 1,100 tons from the Lackawanna Steel Co., which has received an order for 5,000 tons from Canadian railroad contractors. The demand for light rails continues fairly active. Railroads generally are specifying freely against contracts.

Sheet Prices

Cutting on sheet prices continues, and the issue of a new card by the principal interest is expected. Contracting for steel bars for the present is about concluded, while specifications continue heavy. Jobbers report heavier buying of wire products, but price concessions are being made.

VERY LOW PRICES

Named on Valley Pig Iron—Trading in a Quiet Way.

Pittsburg, July 6. (By wire.)

Late developments show that some very low prices have been quoted in connection with the few small sales of pig iron in this market and a local consuming interest has closed for a small lot of standard No. 2 foundry iron on a basis of $14.10, valley, with a 90-cent freight rate. Practically all of the trading during the past week has been in a quiet way and only in a few instances have the low prices established by these sales become public. As a result of the low prices and the number of inquiries withdrawn for Bessemer pig iron, production of pig iron is to be still further curtailed this month. The Sharpsville furnace of the Sharpsville Furnace Co. will be placed on the inactive list probably the latter part of this week and others will be blown out later.

THE WEEK IN IRON CENTERS

PITTSBURG.

More General Shading of Prices on Finished Material.

Office of THE IRON TRADE REVIEW,
510 Park Building, July 5.

Owing to the number of plants closed on June 30 for inventory and repairs and the suspension on account of the holiday, the past week has been an extremely quiet one as far as the local iron and steel market is concerned. There is a fair volume of business being booked and this is probably due to the fact that price concessions are being offered in many lines. However, prices are being shaded only in cases where there is actual business to be placed and as a result the total bookings for the week, although not large, are somewhat heavier than anticipated for the first week in July.

The Republic Iron & Steel Co., which closed its plants on June 30 for inventory and repairs, will start its steel mills on July 11. The company has not yet signed the union scale for its iron mills employing union labor. The mills of the Youngstown Sheet & Tube Co. and LaBelle Iron Works likely will start up again about the middle of the month and the Pittsburg Steel Co.'s mills will not resume operations until the latter part of the month. Several other plants, including some sheet and tin mills, are down for repairs.

No agreement has been reached as yet between the Amalgamated Association of Iron, Steel & Tin Workers and the Western Bar Iron Association regarding the wage scale for the year ending June 30, 1911. The second conference, held at Detroit, has been adjourned and another meeting will be held the latter part of the month. Indications are that the controversy between independent sheet and tin plate makers who signed the union scale and their employes concerning the "check-off" clause will be adjusted shortly.

The McClintic-Marshall Construction Co., Pittsburg, has been awarded a contract for all the bridge and viaduct work on the 83-mile extension of the Western Maryland railroad, which involves upwards of 12,000 tons of structural steel. The Potomac River Steamship Co. has awarded a contract to the Newport News Ship Building & Dry Dock Co. for two boats, which will require more than 4,000 tons of plates and other material, and it is expected that a contract for the plates, etc., will be awarded in the immediate future. Prices of plates are a little easier, and 1.45c, Pittsburg, represents the market level. Prices of structural material are a shade easier. Buying of semi-finished steel is only moderate.

More general buying of wire and nails in small lots is noted at slightly lower prices. Shading of prices on black and galvanized sheets is more general. The steel bar market shows considerable activity and the tin plate market is satisfactory to makers. Some large awards for steel line pipe are pending.

There has been little change in conditions surrounding the pig iron market. Many inquiries have been withdrawn. There is little activity in the coke market and weekly reports show still further curtailment of production. Prices of nearly all grades of scrap have been reduced.

Pig Iron.—On account of the inquiries for pig iron withdrawn during the last ten days, there is comparatively little written inquiry pending in this market at present. Few sales have been made, and the market is extremely quiet. Furnace interests apparently are not anxious to make sales at prices established by recent transactions, and consumers evidently are holding out for still lower prices. Aside from a few scattered sales of small lots of foundry iron, comparatively little iron has exchanged hands during the past week.

The monthly average of pig iron prices, as announced for June, shows the average on Bessemer to have been $15.62, valley, or $16.52, Pittsburg, as compared with $16.203, valley, or $17.103, Pittsburg, for May. The basic average for June was $14.70, valley, or $15.60, Pittsburg, as against $15.044, valley, or $15.944, Pittsburg, for the preceding month.

While $15.75, valley, on Bessemer, and $14.75, valley, on basic no doubt could be shaded, comparatively few sales have been made below these figures. Consuming interests which withdrew their inquiries for both Bessemer and basic iron last week have not entered the market again, although a consumer of basic is understood to have taken a small lot for July delivery, and is expected to come into the market shortly for its full requirements for last half. Most of the trading during the week has been in foundry iron, but only small lots are involved.

The Hall furnace of the Republic Iron & Steel Co., at Sharon, Pa., is idle and is undergoing repairs. The Clinton furnace of the Clinton Iron & Steel Co., Southside, Pittsburg, which has been idle for the last two or three months, and which has undergone a general overauling, will be blown in shortly. The company has its yard pretty well cleaned up.

On July 1 the Valley Mold & Iron Co. took over the Alice furnace, formerly owned by the Youngstown Sheet & Tube Co. This stack resumed operations recently.

In view of the fact that there has been no buying to test the market, we continue to quote the following prices:

Pig Iron Prices.

(Prompt Shipment.)

Bessemer, valley	$15.75
Bessemer, Pittsburg	16.65
Basic, valley	14.75
Basic, Pittsburg	15.65
No. 2 foundry, Pittsburg	15.40
Gray forge, Pittsburg	14.65
Malleable, Pittsburg	15.90

(Third Quarter.)

Bessemer, valley	$15.75
Bessemer, Pittsburg	16.65
Basic, valley	14.75
Basic, Pittsburg	15.65
No. 2 foundry, Pittsburg	15.40
Gray forge, Pittsburg	14.65
Malleable, Pittsburg	15.90

Ferro-Alloys.—There is fairly heavy inquiry for ferro-manganese, and several sales of small lots on a basis of $39.50, Baltimore, for prompt shipment are noted. Some of the inquiries for 50 per cent ferro-silicon noted recently have been withdrawn.

We quote, ferro-manganese at $39.50, Baltimore, for third quarter, and from $40 to $40.50 for second half. The freight rate from Baltimore to Pittsburg is $1.95 per ton.

Fifty per cent ferro-silicon is quoted at $59.50 to $60, Pittsburg; domestic 12 per cent, $26.90; 11 per cent, $25.90; 10 per cent, $24.90, Pittsburg, for third quarter, and $1 advance for last half. The foreign grades are held at $1 or more a ton over domestic prices.

Plates.—Actual bookings at present are not very heavy, although there is a large volume of new business in plates in sight for last half and specifications are perhaps a little heavier than during the early part of June. The Potomac River Steamship Co. has awarded a contract to the Newport News Ship Building & Dry Dock Co. for two new boats, which will require in the neighborhood of 4,000 tons of plates and other material.

Contracts for the plates and other material have not yet been awarded. A large portion of the specifications being entered at present are for plates to be used in large pipe lines and oil tanks in western territory. While definite action has not been taken as yet regarding the plates and shapes to be used in the Panama canal lock work, it is the general understanding that the Jones & Laughlin Steel Co. will furnish the bulk of this tonnage and probably all of it. Prices are easier, and 1.45c, Pittsburg, is thought to represent the market level. The lower price is bringing out some new business and makers are more optimistic than a month ago. We quote the market as follows:

Tank plates, ¼ inch thick, 6¼ to 100 inches, 1.45c. Extras are as follows, per 100 pounds: Boiler and flange steel plates, 0.10c; A. B. M. A. and ordinary firebox steel plates, 0.20c; still bottom steel, 0.20c; marine steel, 0.40c; locomotive firebox steel, 0.50c; all sketches, excepting straight taper plates varying not more than 4 inches in width at ends, narrowest end not being less than 30 inches, 0.10c; circle, 0.20c. Plate in widths over 100 inches up to 110 inches, 0.05c; over 110 inches up to 115 inches, 0.10c; over 115 inches up to 120 inches, 0.15c; over 120 inches up to 125 inches, 0.25c; over 125 inches up to 130 inches, 0.50c; over 130 inches, 1c. Gages under ½ inch to and including 3-16 inch plate on thin edge, 0.10c; under 3-16 and including No. 9, 0.25c. Five cents extra for less than carloads. Terms, net cash in 30 days.

Sheets.—Practically all of the independents are shading prices of black sheets $2 and $3 a ton, and in a few instaces prices of galvanized sheets are being shaded $3 and $4 a ton. A few of the independents and the leading interest, however, are not shading prices, and the report that a new card has been issued is denied. Automobile manufacturers and users of sheet mill specialties are still buying heavily. Jobbers are not taking on any more stock than is absolutely necessary. A few of the sheet mills are idle for repairs, while others which would not accept contract business a few months ago have been closed down temporarily. Present sheet prices, Pittsburg base, are nominally as follows, with $1 a ton added as the delivered price in the Pittsburg district:

Blue annealed sheets, Nos. 3 to 8, 1.70c; Nos. 9 and 10, 1.75c; Nos. 11 and 12, 1.80c; Nos. 13 and 14, 1.85c; Nos. 15 and 16, 1.95c; box annealed sheets, Nos. 10 and 12, 2c to 2.05c; Nos. 13 and 14, 2.05c to 2.10c; Nos. 15 and 16, 2.10c to 2.15c; Nos. 17 to 21, 2.15c to 2.20c; Nos. 22 to 24, 2.20c to 2.25c; Nos. 25 and 26, 2.25c to 2.30c; No. 27, 2.30c to 2.35c; No. 28, 2.25c to 2.35c; No. 29, 2.40c to 2.45c; No. 30, 2.50c to 2.55c; galvanized sheets, Nos. 12 to 14, 2.40c to 2.45c; Nos. 15 and 16, 2.50c to 2.55c; Nos. 17 to 21, 2.65c; Nos. 22 to 24, 2.80c; Nos. 25 and 26, 3c; No. 27, 3.20c; No. 28, 3.30c to 3.40c; No. 29, 3.50c; No. 30, 3.75c; painted roofing sheets, $1.70 per square for No. 28 gage, 2½-inch corrugation, and galvanized roofing sheets, $3 per square for No. 28 gage, 2½-inch corrugation.

Tin Plate.—There is a fair volume of new business in tin plate being booked and most of the local plants are operating to capacity. Users continue to specify freely and it is expected that the small number of mills which have been closed down for repairs will be started again in a short time. Makers admit that the warm weather is interfering to a certain extent with the operation of their plants, but there has been little, if any, falling off in production. The base price on tin plate, over which premiums are being paid in some instances for desirable deliveries, is as follows:

Coke tin plate, 100-pound basis, 14 x 20, $3.60, f. o. b. mill, Pittsburg district.

Rails and Track Material.—Moderate buying of standard and light rails is noted, total bookings for June showing a slight increase over the previous month. However, most of the buying recently has been in small lots and has been done by users who were supposed to have covered for their full requirements. The leading interest booked approximately 3,500 tons of light rails and several lots of standards, ranging from 400 to 1,000 tons. One of the encouraging features of this market is the fact that the railroads are specifying freely and have taken their full requirement of rails up to July 1. Sales during the past week have established a price of $27 on light rails on base weight of 40 to 45 pounds in carload lots, although this price may be shaded on heavier tonnage. On account of the improvement and betterment work, the railroads are buying spikes and track bolts more freely. We quote Bessemer rails as follows, the base price on open-hearth rails being $30, mill.

Fifty-pound and heavier, 500-ton lots and over, $28; carloads and less than 500 tons, $30; less than carload lots, $32; light rails on base weight of 40 to 45 pounds, $27, the schedule on the other weights being irregular and subject to negotiations; angle splice bars for standard sections, 1.50c, Pittsburg; standard spikes, 1.75c, Pittsburg; hand spikes, 1.80c to 1.85c, Pittsburg; track bolts, 2.50c, Pittsburg.

Steel.—There has not been a great deal of activity in semi-finished steel lines during the week, and most of the sales have been for small lots for prompt shipment. Inquiries now pending involve heavy tonnage and makers are more optimistic concerning the outlook for the next six months. Sales of Bessemer billets are reported at from $25 to $25.50, makers' mill. While some buyers claim to have bought Bessemer sheet bars at $26, makers' mill, sales have been made at $27, makers' mill. Only a few mills, however, have been able to obtain the latter price, and, while $26.50, makers' mill, is regarded as representing the general market level, $26 can be done at some plants. Forging billets are still selling around $32, Pittsburg. There has been no change in the open-hearth steel market and prices are firm.

Bessemer 4 x 4 billets with 0.25c carbon and less are quoted at $25 to $25.50, Pittsburg, with the usual extras for size and analysis, and open-hearth rolling billets, from $28 to $28.50, Pittsburg. Forging billets are quotable at $32, Pittsburg. Bessemer sheet and tin bars are quoted at $26 to $26.50 and open-hearth sheet bars are quoted at $29 to $29.50, at makers' mill, located within the $1, Pittsburg, freight limits.

Hoops and Bands.—Makers of hoops and bands report that new business and specifications are satisfactory, and that prices are being maintained. Practically all of the contracts which expired June 30, have been renewed, and the outlook for this branch during the last half of the year is encouraging. We quote the market as follows:

Hoops in carload lots, 1.55c to 1.60c; in less than carload lots, 1.70c to 1.75c; bands, 1.45c to 1.50c, base, with net extras, as per standard steel.

Merchant Bars.—There has been a slight falling off in new bookings of steel bars, as practically all of the farming implement tonnage for this year has been placed. However, there is still a fair volume of new business coming from other sources, and local plants are assured steady operation for several months. Only a few plants are idle and these will be started again as soon as the necessary repairs are made. Prices of steel bars are absolutely firm at 1.45c, Pittsburg. The bar iron market continues weak, and

low prices are being quoted. Reports that 1.50c, Pittsburg, is being shaded have not been confirmed. Owing to the falling off in actual bookings, makers of shafting are now able to show some improvement in delivery periods. We quote the market as follows:

Common iron bars, 1.50c, Pittsburg; Bessemer and open-hearth steel bars, 1.45c; plow and cultivator, 1.45c; channels, angles, zees, tees, under 3-inch, 1.45c, all f. o. b. mill. The following differentials are maintained on steel: Less than 2,000 pounds of a size, 0.35c advance. Cold rolled and ground shafting, 55 per cent in carloads and 50 per cent in less than carloads, delivered in base territory.

Structural Material.—The largest structural award in this district during the week was that made to the McClintic-Marshall Construction Co., Pittsburg, for all bridges and viaducts along the 83-mile extension of the Western Maryland railroad between Connellsville, Pa., and Cumberland, Md., on which actual construction has been started. Upwards of 12,000 tons of structural steel are involved, and the heaviest bridge work will be on the Cumberland end of the line. There will be about seven bridges, some of which will be small. It is announced that the decision of the United States supreme court invalidating the $6,775,000 bond issue of the city of Pittsburg indefinitely postpones the building of a proposed new bridge in the Point district, Pittsburg, on which some of the bids have been invited, and which would involve from 6,000 to 8,000 tons of structural material. Some large structural contracts are pending, but most of the awards during the past week have been for small lots, the major portion of the work being held up indefinitely. A contract likely will be awarded during the week for the new bridge across the Allegheny river at Oil City, Pa., involving 1,500 tons of steel. Most of the local fabricating shops are running full time on work originating in other sections of the country. Prices are not very firm, and, while 1.50c is still being asked by some sellers, 1.45c represents the market level. We quote the market as follows:

Beams and channels, 15 inches and under, 1.45c; over 15 inches, 1.55c; zees, 1.45c; tees, 1.50c; angles, from 3 to 6 inches, 1.45c; over 6 inches, 1.55c; universal and sheared plates, 6¼ inches wide and wider, 1.45c.

Merchant Pipe.—No action has been taken as yet regarding large inquiries for steel line pipe noted recently, and there has been little change in the market on pipe in this district. Practically all makers have advised the trade that the present price list will be extended to cover the last quarter of this year. The largest inquiry pending at present is that of an Ohio gas company for 60 miles of 16-inch pipe. Two or three other interests expect to enter the market shortly, and a western interest is expected to make a large award in the near future. There is little demand for iron pipe, and prices are not very firm. We quote the following official discounts in carload lots, subject to the usual preferential discount to the larger buyers, merchant pipe, where specified, being offered in from ⅛ to 6 inches:

	—Steel—		—Iron—	
	Black.	Galv.	Black.	Galv.
⅛ and ¼ inch	70	54	66	..
⅜ inch	71	57	67	53
½ inch	74	62	70	58
¾ to 6 inch	78	68	74	64
7 to 12 inch	72	57	68	53
13 to 15 inch.....	51½	..	..	..
PLUGGED AND REAMED.				
1 to 4 inch	76	66	71	61
EXTRA STRONG PLAIN ENDS.				
⅛ to ⅜ inch	63	51	58	46
½ to 4 inch	70	58	65	53
4½ to 8 inch.....	66	54	61	49
9, 10, 11 and 12 inch	59	47	54	42
DOUBLE EXTRA STRONG PLAIN ENDS.				
½ to 8 inch	59	48	54	43

Boiler Tubes.—There is only moderate buying of merchant and locomotive boiler tubes, but specifications are keeping up fairly well. Some large contracts are being negotiated, and awards likely will be made shortly. We quote the market as follows:

	Steel.	Iron.
1 to 1½ inch.....	49	43
1¾ to 2¼ inch.....	61	43
2½ inch	63	48
2¾ to 5 inch.....	69	55
6 to 13 inch	60	43

2½ inch and smaller, over 18 feet, 10 per cent net extra.

2¾ inch and larger, over 22 feet, 10 per cent net extra.

To destination east of the Mississippi river will be sold at delivered discount for carloads lowered by two points, for lengths 22 feet and under; longer lengths, f. o. b. Pittsburg.

Wire Products.—Heavier buying of wire and nails throughout the country is reported by makers. Jobbers have placed some large orders for direct shipment to consumers, but in most all cases concessions in prices are being offered on desirable business. Both wire and cut nails are being sold on a basis of 1.75c, and it is the understanding that prices of wire are being shaded. We quote the market as follows, contracts for the jobbing trade being limited usually to 60 days:

Wire nails, jobbers' carload lots, $1.75; retailers' carload lots, $1.80; painted barb wire, jobbers' carload lots, $1.80; retailers' carload lots, $1.85, with 30c for galvanizing; plain wire to jobbers in carloads, $1.60, and to dealers, in carloads, $1.65; polished staples, $1.80; galvanized staples, $2.10.

Wire Rods.—Low prices are still being made on Bessemer and open-hearth rods, although a few sellers have withdrawn low quotations made last week. Buying is only moderate, and specifications are about the same as last week. We quote $30 to $31, Pittsburg, on Bessemer and open-hearth rods.

Coke.—The local coke market has been exceedingly quiet during the past week, there being little demand for prompt or last half furnace coke. While most sellers are endeavoring to maintain prices of from $1.60 to $1.70, ovens, for prompt furnace coke, this price is known to have been shaded in a few instances. It is understood that the Westinghouse Electric & Mfg. Co. has about concluded negotiations for 15,000 tons of foundry coke for a period of one year. The foundry coke market appears to be a little more active, although consumers are buying in small lots. It is expected that a statement will be issued in a few days concerning the proposed merger of the independent producing companies in the Connellsville region and giving a list of officers of the new company. While some inquiries for both furnace and foundry coke have been withdrawn, several large consumers are figuring on their requirements for the balance of the year and for a period of 12 months. We quote standard Connellsville furnace coke for prompt delivery at from $1.60 to $1.70, ovens, and on contract, we quote from $1.80 to $1.90, ovens. On high grade Connellsville foundry coke, we quote from $2.10 to $2.25 for prompt delivery. On contract, we quote from $2.25 to $2.50, ovens. The Connellsville *Courier's* figures for the week ending June 25 show 29,631 ovens active with an output of 393,476 tons, compared with 30,183 active ovens and a production of 404,809 tons the previous week.

Old Material.—With the exception of iron axles and stove plate, quotations on every grade of old material in the list given below have been reduced from 25 to 50 cents a ton. Considerable weakness has developed, and with the closing down of a number of plants there is scarcely any demand for scrap. The Pennsylvania Railroad Co. during the week asked for bids on from 20,000 to 25,000 tons of old material, including from 7,000 to 10,000 tons of steel rails, bids to be submitted not later than July 12. The Pennsylvania Lines west of Pittsburg during the week disposed of a portion of their offerings of old material at comparatively low prices. It is understood that the list put out by the

Pennsylvania Lines west included from 10,000 to 15,000 tons of scrap. We quote, gross tons, delivered in the Pittsburg district, including Monessen, Sharon, Steubenville, Brackenridge and Follansbee, as follows:

Heavy melting scrap	$14.25 to 14.75
Rerolling rails	15.75 to 16.25
Bundled sheet scrap	10.50 to 11.00
Iron axles	24.50 to 25.00
Old iron rails	16.00 to 16.50
No. 1 wrought scrap	15.00 to 15.50
Old car wheels	14.75 to 15.25
Low phosphorus	17.75 to 18.25
Machine shop turnings	9.00 to 9.50
Cast borings	7.75 to 8.25
No. 1 cast scrap	14.50 to 15.00
Malleable	14.75 to 15.25
Stove plate	10.25 to 10.75

CHICAGO.

Increased Weakness in Several Lines —Holiday Distractions.

Office of THE IRON TRADE REVIEW, 1328 Monadnock Block, July 5.

During the month of July, if not for a longer period, business in the iron and steel trade is expected to show a very decided falling off, so that the present condition of extreme quietness, amounting to dullness in some lines, with a consequent weakening of values, is not disappointing. It is hardly probable that there will be much of a business revival before the end of the month, but after that time a decided improvement is looked for in practically all of the branches of the iron and steel business. Locally, much interest has attached to the unusual celebration of the Fourth of July, in which many companies of regular soldiers have been engaged and the program is arranged to continue for at least another week. This has enlisted the interest of the general public and has been quite an important factor in distracting attention from business matters. The principal feature to be noted at present is that of an increased weakness in several lines. Bar iron is no stronger than at the date of last report, and plates and shapes also are lacking in strength. This is particularly true of the former, in which some quiet concessions are being made. Light steel rails are lower and also spikes and track bolts, while the continued weakness in pig iron has affected the quotations on cast iron pipe.

Pig Iron.—The quietness which has prevailed in pig iron circles for several weeks bids fair to continue through the present month at least, but there are some who are confidently expecting a turn for the better before many days of August have passed. The amount of business going in the local market at the present time is not heavy and small transactions are characteristic. Some consumers of pig iron, who bought when the market was considerably higher, have been known to send hold-up orders on shipments to the furnaces and quietly buy for immediate requirements at the lower figures now prevailing. In some cases, the furnaces with which the earlier contracts were made, becoming cognizant of the situation, have tacitly agreed to defer the shipment of the high price iron until a later period, and to make new sales for current requirements at the present low level of prices. It has been reported that one of the large southern interests has been quietly soliciting, through its agents, business for the remainder of the year at $11.50, Birmingham. A local foundry and machinery company, whose inquiry for upwards of 2,000 tons hung on for many weeks, is understood to have quietly bought a large part of this iron and is now in the market for 500 tons of No. 1 soft iron for delivery during the last quarter. A large local pipe-fitting concern is in the market for a few hundred tons of high silicon. Considerable interest is being manifested among malleable Bessemer melters, both in the immediate Chicago territory and also in Milwaukee. One inquiry of this kind which is now being made is for 1,000 tons for delivery the last half of the year. A steel casting concern in Milwaukee is in the market for 600 tons of low phosphorus iron for delivery during the last half of the year. It is stated that the inquiry of the South Bend plow interest has been withdrawn from the market for the time being. The much-talked-of curtailment of production has not amounted to as much in this district as was expected, as the number of furnaces which have gone out of blast are comparatively few, and cessation of operation at these plants has been due rather to the physical condition of the furnaces than to any arbitrary closing down in order to reduce the production of pig iron. During the present month, however, it is quite probable that more furnaces will voluntarily cease operations either through banking or blowing out, until a more healthy condition of trade exists.

Lake Superior charcoal	$18.50 to 19.00
Northern foundry No. 2	16.50 to 17.00
Southern foundry No. 2	15.85 to 16.35
Southern silveries, 5 per cent silicon	17.85 to 18.35
Jackson Co. silveries, 8 per cent.	20.40 to 20.90
Malleable Bessemer	16.50 to 17.00
Alabama basic	16.35 to 16.85

Billets.—Eastern conditions and prices continue to govern this market, as no local billets are available.

Merchant Bars.—The bar market is possibly a trifle quieter this week with specifications falling off a little bit, which is nothing more than could be expected during the summer holiday season. No car orders of any consequence are in sight.

We quote, for Chicago delivery, as follows: Bar iron, 1.40c to 1.45c; hard steel bars, re-rolled, 1.50c to 1.60c; soft steel bars and bands and small shapes, 1.63c to 1.68c, base; hoops, 1.78c to 1.88c; planished or smooth finished tire steel, 1.83c to 1.88c; iron finish, up to 1½ by ½ inch, 1.78c, base, tire card; iron finish, 1½ by ½ inch and larger, 1.63c, base, bar card; channels for solid rubber tires, ¾ to 1 inch, 2.13c, flat, and 1⅛ inch and larger, 2.03c, flat; smooth finished machinery steel, 1 inch and larger, 2.43c; flat sleigh shoe, 1.73c; toe calk, 2.23c; spring steel, 2.28c; crucible spring steel, 2.78c; tool steel, 7c to 9c, with higher prices for special grades. Quotations on shafting are 55 per cent off the list for carload lots, and 50 per cent off for less than carload lots, carload freight allowed to points in base territory.

On iron and steel bars from local stocks, we quote as follows: Bar iron, 1.80c to 1.90c, base; soft steel bars, 1.90c to 2c per 100 pounds, base; soft steel hoops, 2.40c to 2.50c; full extras.

Structural Material.—Another light week is recorded in the closing of building contracts, but there is constantly going on an accumulation of good prospects in this line which probably will be released early in the second half of the year. This is particularly true of buildings in Chicago, a number of which are being held up for financial and other reasons, but it is practically certain that they will be built in the near future. Among the projects which are about to be closed is a warehouse to be built for Marshall Field & Co., which will require 2,000 tons of steel, contract for which will be let today. The Bankers' Insurance building, at Lincoln, Neb., 250 tons, will be let soon; Bethlehem shapes are specified. The steel for the Halsted Street Bank, in this city, which was mentioned in this report last week, has been let to George W. Jackson, Inc. The American Bridge Co. will furnish the 150 tons of steel for the plate and forge shops of the Minnesota Steel Co., at Duluth. The same interest took orders for 500 tons of axles from the Pullman Co. The Adams school at San Francisco, 120 tons, went to the Ralston Iron Works, of that city. The Daniels & Fisher building, at Denver, 1,000 tons, went to J. L. Patterson, a local erecting contractor. The general contract for the Jefferson Hotel at Peoria, Ill., has been let, but revised plans will be prepared and the contract for the 1,000 tons of steel will be let later.

We quote, mill prices, for structural shapes, Chicago delivery, as follows:

Beams and channels, 15 inches and

under, 1.63c to 1.68c. For extras, see Pittsburg report.

Local store prices are as follows: All angles, 3 inches and larger, including 6 inches, $1.90 to $2 per 100 pounds; angles over 6 inches, $2 to $2.10 per 100 pounds, base; beams, 3 to 15 inches, inclusive, $1.90 per 100 pounds, base; channels, 3 inches and larger, $1.90 per 100 pounds, base.

Steel Rails and Track Supplies.—There is nothing doing in steel rails at the present time, and there probably will be no sales of standard section rails for three months. Light rails are weaker and quoted at lower figures and concessions also are made in spikes and track bolts.

See Pittsburg report for prices on standard sections.

On light rails Chicago delivery, we quote as follows: Light rails, 35, 40 and 45-pound, $26; 16, 20, 25 and 30-pound, $27; 12-pound, $28.00.

Light section re-layers, 45 pounds and under, subject to inspection, $21 to $23; standard section re-laying rails, subject to inspection, $23.50 to $24.

Track supplies, f. o. b. Joliet, angle bars, 1.50c to 1.60c; railroad spikes, 1.70c to 1.80c; smaller size spikes, 1.75c base; track bolts with square nuts, 2.30c to 2.40c, base; with hexagon nuts, 2.45c to 2.55c.

Plates.—This market is very quiet with some appearance of weakness. It has been reported that quotations are being made at 1.60c, Chicago, although, officially, nothing is known lower than 1.63c.

We quote, Chicago delivery, as follows: Tank plates, ¼ inch thick, 6¼ to 100 inches, 1.63c to 1.68c. For extras, see Pittsburg report.

Store quotations are without change, as follows: Tank steel, ¼ inch and heavier, up to 72 inches wide, 1.90c to 2c; from 72 inches to 96 inches wide, 2c to 2.10c; 3-16 inch up to and including 60 inches wide, 2c to 2.10c; 72 inches, 2.25c to 2.35c; No. 8, up to 60 inches wide, 2.05c to 2.15c. Flange and head quality, 25c extra.

Sheets.—The sheet market presents about the same features as a week ago, with the same indication of uncertainty as to the actual quoted figures. Naturally, there is apparent the mid-summer quiet, the local sheet mill closed down Saturday for repairs and stock-taking and will resume operations on July 11.

For mill prices, see Pittsburg report. Freight to Chicago, 18 cents.

We quote store prices at Chicago as follows: No. 10, 2.25c to 2.35c; No. 12, 2.30c to 2.40c; No. 14, 2.35c to 2.45c; No. 16, 2.45c to 2.55c; Nos. 18-20, 2.80c to 2.90c; Nos. 22-24, 2.85c to 2.95c; No. 26, 2.90c to 3c; No. 27, 2.95c to 3.05c; No. 28, 3c to 3.10c; No. 30, 3.30c; galvanized sheets, Nos. 10 to 16, 3.20c to 3.30c; Nos. 18 and 20, 3.35c to 3.45c; Nos. 22 to 24, 3.50c to 3.60c; No. 26, 3.50c to 3.80c; No. 27, 3.90c to 4c; No. 28, 4.10c to 4.20c; No. 30, 4.50c to 4.60c.

Wire Products.—There are absolutely no new features to report in the wire market this week, business having settled down to the mid-summer holiday basis with no expectation of much of a revival for a few weeks.

We quote, Chicago delivery, as follows:

Wire nails, jobbers' carload lots, $2.03; retailers' carload lots, $2.08; retailers' less than carload lots, $2.18; painted barb wire, jobbers' carload lots, $2.03; retailers' carload lots, $2.08; retailers' less than carload lots, $2.18; with 30c for galvanizing; plain wire to jobbers, $1.83; plain wire, retailers' carload lots, $1.88; staples, bright, $2.03.

Merchant Pipe and Tubes.—There is nothing but a very quiet market to report in this line this week with former conditions and prices prevailing.

For mill discounts see Pittsburg report.

We quote, out of store, as follows: Wrought steel pipe, black, ⅛ inch to ¼ inch, 67.2 per cent; ⅜ inch, 68.2 per cent; ½ inch, 71.2 per cent; ¼ inch to 6 inches, 75.2 per cent; 7 inches to 12 inches, 68.2 per cent. Iron pipe, about 5 points higher.

Lap weld steel tubes, 2¾ inches to 5 inches, 60 to 62 per cent; charcoal iron tubes, 2¼ inches to 4 inches, 48 to 50.

Cast Iron Pipe.—Only a small amount of routine business was booked during the past week. As intimated last week, the leading interest, being the lowest bidder on the Cincinnati contract for 1,500 tons of 30-inch pipe, was awarded the contract. Formal prices on cast iron pipe show a concession of 50c a ton.

We quote, prices f. o. b. Chicago, as follows: Four-inch water pipe, $28.00; 6 to 16 inches, $27.00; larger sizes, $26.00; gas pipe, $1.00 a ton higher.

Old Material.—The scrap market shows no improvement and with scarcely any business moving, prices are subject to negotiations and have a decided tendency toward weakness.

We quote, gross tons, as follows:

Old car wheels	$15.00 to 15.50
Old iron rails	17.00 to 17.50
Rerolling rails (4 ft. and over)	16.50 to 17.00
Old steel rails (2 ft. and under)	13.50 to 14.00
Frogs, switches and guards	12.50 to 13.00
Heavy melting steel	12.50 to 13.00
Shoveling steel	12.00 to 12.50

We quote, net tons, as follows:

No. 1 R. R. wrought	$12.75 to 13.25
No. 2 R. R. wrought	11.50 to 12.00
Arch bars and transoms	15.50 to 16.00
Knuckles, couplers and springs	12.00 to 12.50
Shafting	17.50 to 18.00
Iron car axles	20.00 to 20.50
Steel car axles	20.00 to 20.50
Locomotive tires	18.00 to 18.50
Dealers' forge	11.50 to 12.00
Pipes and flues	9.50 to 10.00
No. 1 cast, 150 lbs. and less	13.00 to 13.50
No. 1 busheling	10.50 to 11.00
No. 2 busheling	8.25 to 8.75
No. 1 boiler cut	9.50 to 10.00
Boiler punchings	15.00 to 15.50
Cast and mixed borings	5.00 to 5.50
Machine shop turnings	7.75 to 8.25
Railroad malleable	11.50 to 12.00
Agricultural malleable	11.25 to 11.75
Stove plate and light cast scrap	11.25 to11.75
Angle bars, splices, etc. (iron)	14.50 to 15.00
Angle bars, steel	12.75 to 13.25

CLEVELAND.

Structural Contracts Let.—New Record in Ore Shipment.

Office of THE IRON TRADE REVIEW,
Penton Bldg., Chestnut and E. 12th, July 5.

Iron Ore.—Iron ore shipments for June made a new record, being 7,316,679 tons, compared with 5,393,255 tons in June, 1909. At this rate, it would be easy to move 50,000,000 tons during the season, but it is not safe to make predictions, as the blowing out of furnaces may sharply decrease the demand for ore later in the season.

On base ores with the guarantee of 55 per cent on old range and Mesabi Bessemer, and 51½ per cent on old range and Mesabi non-Bessemer, we quote as follows: Old range Bessemer, $5.00; Mesabi Bessemer, $4.75; old range non-Bessemer, $4.20; Mesabi non-Bessemer, $4.00.

Pig Iron.—The market is extremely dull, and an inquiry for 1,000 tons comes from Galion, O. No other inquiries of importance are pending in this district. This condition may be due in part to the Fourth of July holidays, but it is not very encouraging. The impression seems to be gaining strength that there will be a quiet summer. Quotations are nominally unchanged, but there has not been enough business to test the market. For prompt delivery, we quote delivered in Cleveland as follows:

No. 1 foundry	$15.75 to 16.00
No. 2 foundry	15.25 to 15.50
No. 2 Southern	15.85
Gray forge	14.65 to 14.90
Bessemer	16.65
Lake Superior charcoal	18.50 to 19.00
Jackson Co. 8 per cent silvery	20.00 to 20.50

Coke.—After the closing of a number of contracts for foundry coke, the market has been quiet, but it is probable that more contracts will soon be closed. We quote Connellsville furnace coke at $1.55 to $1.60 for prompt delivery, and $1.80 to $1.90 for last half. We quote Connellsville foundry, prompt at $2.10 to $2.20 and last half $2.25 to $2.50.

Finished Material. — Specifications

have been coming in fairly well, but new business is quiet. The demand for steel bars, shafting, and blue annealed sheets is well maintained.

The contract for the Niagara Falls plant of the National Carbon Co., Cleveland, has been awarded to T. H. Brooks & Co., Cleveland. The steel shapes required, amounted to 1,300 to 1,500 tons, have not yet been awarded. The Carnegie Steel Co. has taken 2,500 tons of plates and shapes from the Toledo Ship Building Co., for a car ferry to be built by the Ann Arbor railroad. The Wheeling & Lake Erie railroad has purchased 1,200 tons of steel rails from the Carnegie Steel Co., and 1,100 tons from the Lackawanna Steel Co. Bids on the new Cleveland Athletic Club addition to the Brown building, requiring about 1,000 tons, will be received Saturday. Several other building projects are pending.

There is considerable price irregularity on some products, especially sheets, excepting blue annealed. Cleveland iron mills are closed for the usual summer shut-down, and the time of their resumption is uncertain. An inquiry for 1,000 tons of tank plates is pending.

The contract for the new Fremont, O., plant of the National Carbon Co. has been let to the Riverside Bridge Co., of Martin's Ferry, O. The Massillon Bridge & Structural Co. secured the contract for the erection of the new boiler house and foundry for the Lima Locomotive & Machine Co., of Lima, O. The tonnage will be: Power house, 135; foundry, 446. The buildings measure 130 x 120 and 380 x 120 feet, respectively.

Old Material.—There is no material change in the general condition of the scrap market in this district from the dullness which was noted last week. Reductions of 50c will be noted in old iron rails, railroad malleable and heavy steel. We quote, gross tons, f. o. b. Cleveland, as follows:

Old iron rails	$16.00 to 16.50
Old steel rails (under 6 feet)	14.50 to 15.00
Old car wheels	13.50 to 14.00
Old steel boiler plate	11.50 to 12.00
Malleable iron (railroad)	13.00 to 13.50
Steel axles	19.50 to 20.00
Malleable iron (agricultural)	12.00 to 12.50
Heavy steel	13.25 to 13.50
Country mixed steel	12.00 to 12.50

We quote, net tons, as follows:

No. 1 R. R. wrought	$13.50 to 14.00
No. 1 busheling	12.00 to 12.50
No. 1 machine cast	12.25 to 12.50
Axle turnings	10.00 to 10.50
Machine shop turnings	7.25 to 7.75
Grate bars	10.50 to 11.00
Pipes and flues	11.00 to 11.50
Tank iron	9.00 to 9.50
Sheet iron	6.00 to 6.50
Wrought drilling	7.25 to 7.75
Stove plate	11.00 to 11.50
Cast borings	6.50 to 6.75

The Commercial Car Co., Indianapolis, has increased its capital stock from $100,000 to $500,000.

CINCINNATI.

Market is Listless With a Few Pig Iron Inquiries Pending.

Office of THE IRON TRADE REVIEW, Room 11, Blymyer Bldg., July 5.

Buyers in general are evidencing no particular desire to respond to what may be termed low prices, and the market continues to slowly drag along. Some buying has been done in a quiet way, and a half dozen inquiries continue unfilled, but generally considered the market is quiet and practically featureless. Quotations apparently have undergone no material change, $11.50 to $12.00, representing southern furnace prices for No. 2. While not an open quotation in all instances, it is possible to secure standard Alabama brands at $11.50 where delivery is to extend from now throughout the remainder of the year. The $12.00 quotation is said to be strictly maintained by these furnaces where iron is required for fourth quarter alone. It is said that one or two large interests have even anticipated conditions into the first and second quarter of next year, and have submitted offers at prices that at the present time are prohibitive. Northern foundry grades show no change in prices, some factors advising that suggestions of stiffening are evident. The central Ohio concern that several months since was feeling the market for last half requirements deferred action at that time, and now advises it will close this week. This inquiry called for 1,200 tons of northern and 1,200 tons southern, the analysis corresponding practically with a No. 2. The inquiry that has been pending from one of the large plow manufacturers from Indiana is said to have been indefinitely postponed as prices were not sufficiently attractive at this time to warrant definite action. A southern Ohio manufacturer, who has been in touch with the market for several weeks, and whose inquiry called for quite a large tonnage, has not as yet closed. It is said that the representative of one of the large sanitary concerns, who was here a week or two since, bought some northern iron, but has not as yet secured the desired tonnage for his Louisville plant. A Michigan agricultural interest wants 1,000 tons of foundry iron for delivery throughout the remainder of the year and a jobbing foundry in the same section is inquiring for 200 tons for the same delivery. An Indiana agricultural maker is figuring on 1,250 tons of northern No. 2 and 250 tons southern No. 2 for the rest of the year. Hamilton furnace was blown out June 30, for a period of 60 or 90 days, for relining and general repairs.

We quote prices based on freight rates of $3.35 from Birmingham and $1.20 from Ironton as follows:

Southern foundry No. 1	$15.25 to 15.75
Southern foundry No. 2	14.75 to 15.25
Southern foundry No. 3	14.25 to 14.75
Southern foundry No. 4	14.25 to 14.75
Southern No. 1 soft	15.25 to 15.75
Southern No. 2 soft	14.75 to 15.25
Southern gray forge	14.25 to 14.75
Northern No. 1 foundry	16.70
Northern No. 2 foundry	16.20
Northern No. 3 foundry	15.70
Jackson county 6 per cent silicon	18.70
Jackson county 8 per cent silicon	19.70
Jackson county 10 per cent silicon	20.70

Coke.—Buying of foundry coke continues in a quiet way, with prices practically unchanged. Considerable contracting has been done during the past month, and the market is a little more quiet at this time. Some furnace business is now pending, but producers are showing some unwillingness to close on uncertainties. We quote from the leading coke producing districts as follows:

	Prompt shipment.	Last half of year 1910.
Connellsville district:		
Foundry coke	$2.10 to 2.25	$2.25 to 2.50
Furnace coke	1.60 to 1.75	1.85 to 2.15
Wise county district:		
Foundry coke	2.00 to 2.15	2.15 to 2.25
Furnace coke	1.65 to 1.75	*Sliding [scale basis.
Pocahontas district:		
Foundry coke	2.10 to 2.25	2.25 to 2.50
Furnace coke	1.75 to 1.90	1.90 to 2.10
New river:		
Foundry coke	2.40 to 3.00	2.50 to 3.25
Furnace coke	2.20 to 2.30	2.20 to 2.30

*Sliding scale basis means $1.60 for coke based on $9, Birmingham, for pig iron, with an advance of 16⅔ per cent of the amount over $9 at which pig iron is quoted. This is the usual basis. Other forms of sliding contracts are also made.

Finished Material.—Bars are quotable at 1.45c, shapes 1.50c and plates 1.45c to 1.50c, Pittsburg base. The market for bars is said to be firm and fairly active. Structural demand is well maintained and specifications, while scattering, are coming forward in a very comfortable and acceptable manner. There is nothing of local interest pending, but, taken in the aggregate, contract business is good.

Old Material.—Nothing has occurred to cause any change in the general state of the market, and demand is stagnant, and without feature. Dealers see little in the immediate future that will be of special benefit, and are plodding along, disposing of their stock to the best advantage possible. Prices are said to be unchanged and according to dealers are as follows:

No. 1 R. R. wrought, net tons	$12.00 to 12.50
No. 1 machinery, net tons	11.50 to 12.00
No. 1 busheling, net tons	11.00 to 11.50
Old iron rails, gross tons	17.50 to 18.00
Old iron rails, rerolling	17.00 to 17.50
Old short lengths, gross tons	14.50 to 15.50
Old iron axles, net	18.00 to 19.00
Heavy melting scrap, gross tons	12.00 to 12.50
Stove plate, net tons	9.50 to 10.00
Heavy turnings, net tons	8.50 to 9.00
Cast borings, net tons	6.00 to 6.50
Car wheels	15.00 to 15.50
Grate bars	9.50 to 10.00

The Ohio Shovel & Stamping Co.'s plant, at Canal Dover, O., was damaged by fire, June 21, the loss being estimated at $15,000.

PHILADELPHIA.

Quiet Holiday Week—Low Basic and Foundry Prices.—Ship Awards.

July 2.

Pig Iron.—Quietness generally prevails in the market, but this is not unusual in view of the holiday week, and the rather indifferent course that conditions have followed of late, with the exception of basic metal. The week has brought out a modest inquiry and the total tonnage under negotiation is small, exceeding scarcely more than 5,000 tons in this immediate territory. The Baldwin Locomotive Works is closing upon 2,000 tons additional of the forge variety and two of the cast iron pipe companies have come out with requests for prices upon new lots, one of 3,000 tons, and another of 1,000 tons for early shipment. Quite a wide spread of prices is being quoted on foundry iron in this market, quotations on some recent business having shown a range of fully $1 a ton with $16.25 delivered for No. 2X as the minimum. This price is being named by a western Pennsylvania maker and is equivalent to $14.20 at the furnace. As the Eastern Pennsylvania makers of strictly standard No. 2X do not care to quote at from 25 to 50 cents of this level, some business is going to the seller in question. Quotations fully as low, and even considerably lower, have been made on recent business closed by Lebanon valley makers, but this iron usually sells below the Lehigh at Schuylkill valley grades. Upon these latter irons, the price range is about $16.50 to $16.75, delivered, for No. 2X, as it has been for some weeks past. The Baltimore & Ohio railroad has purchased 1,000 tons of foundry grades for its Baltimore and western shops.

In connection with the recent heavy sales of basic iron to eastern consumers, it develops that $15.50 delivered was done on some round lots, bringing the furnace price in some instances as low as $14.50, which is the lowest point this grade has touched in many months. In one instance at least $15.40 delivered was done but this was on Virginia basic, netting the furnace $13 by reason of a favorable freight rate to the particular consumer. One large interest which took on about 15,000 tons of basic at $15.50 and $15.75 delivered did so not so much because it needed the iron as to average the low price in its costs. It is reported that another steel company will require fully 20,000 tons in addition to that it has just bought, to fill out its third and fourth quarter needs. Virginia No. 2 plain can be purchased at $13.50, at the furnace, but makers are endeavoring to hold to $14 furnace for No. 2 X.

For prompt and third quarter delivery we quote as follows:

No. 1X foundry	$17.00 to 17.50
No. 2X foundry	16.50 to 17.00
No. 2 plain	16.00 to 16.50
Gray forge	15.25 to 15.50
Basic	15.50 to 15.75
Low phosphorus	22.75 to 23.25
No. 2 Birmingham	16.00 to 16.25
No. 2 Virginia	16.80 to 17.00

Finished Material.—Shipbuilding conditions in the east continue to show considerable activity and the position of the various companies has been considerably improved over the past two months. The Pennsylvania railroad this week awarded two steel car floats to the Wm. Cramp & Sons Ship & Engine Building Co., two steel car floats to the Fore River Shipbuilding Co. and a steel ferry boat for the Philadelphia & Camden Ferry Co., to the Staten Island Shipbuilding Co. About 2,000 tons of steel material will be required for these boats but this has not yet been placed with the mills. Other shipbuilding contracts are pending and are expected to be closed within the next several weeks. In Washington, Barber & Ross will fabricate about 1,000 tons for the new buildings of the Washington Investment Co. and Washington Hotel Co. and Bethlehem steel will be used. The trade is interested in learning the full disposition of the 4,500 tons of shapes and plates for car construction at the Lenoir City, Tenn., shops of the Southern Railroad, a part of which went to the Birmingham mills of the leading interest as reported. The award of a considerable part of the tonnage has not been learned absolutely but is reported to have gone to a large eastern mill at a low price. The price situation in structural shapes does not show any improvement and some interests which have been making the 1.45c, Pittsburg, price apply only to carloads or large lots are said to be more liberal in this regard. There is a good tonnage of plates coming out from miscellaneous sources upon which eastern makers are quoting from 1.55c to 1.60c at the mill according to the desirability of the business. The steel bar demand holds up strongly. Sales of same small lots of Bessemer wire rods are noted, at $31 Pittsburg. A number of the eastern iron mills and some of the steel mills are closing temporarily this week for their customary mid-summer shut down.

For Philadelphia delivery we quote unchanged from last week as follows;

Structural shapes, 1.60c to 1.65c; plates, 1.65c to 1.70c, steel bars, 1.60c to 1.65c; iron bars, 1.40c to 1.50c; 4 x 4-inch open-hearth rolling billets, $28 to $29, eastern mills.

Old Material.—Owing to the usual shut-down of many of the iron mills and some of the steel plants in the east, the old material market is very dull this week and consumers are in no mood to consider purchases unless at sharp concessions. As neither the iron nor steel buyers' association is in need of much material, the offerings are $16, delivered, for high-grade wrought and $14, delivered, for heavy steel, which are purely nominal prices. Some small lots of steel are selling at from $14.25 to $14.50, delivered. One mill outside the syndicate is understood to have taken a considerable tonnage recently at about this level. An unexpected demand for borings has put that grade up several degrees in price and it is now upon about the same basis as turnings, which are quiet.

We quote, delivered in eastern consuming territory, as follows:

Old steel rails (rerolling)	$16.25 to 16.75
Heavy melting steel	14.25to 14.50
Old car wheels	14.50 to 15.00
Old iron car axles	25.00 to 26.00
Old steel car axles	20.00 to 21.00
No. 1 railroad wrought	16.00 to 16.50
Wrought pipe	15.00 to 15.50
Cast borings	9.50 to 10.00
Wrought turnings	9.50 to 10.00
Heavy cast scrap	15.00 to 15.50
Railroad malleable	14.00 to 14.50
Stove plate	10.00 to 10.50

NEW YORK.

Pig Iron Market Lacks Life—Less Strength in Finished Prices.

Office of THE IRON TRADE REVIEW,
1115 West Street Bldg., July 5.

Iron Ore.—Trans-Atlantic shipments of foreign ore during the month of June reached about 30,000 tons, of which about 20,000 were Spanish and the remainder Swedish and other grades. Some of the foreign ore interests are encountering considerable difficulty in obtaining shipping instructions from eastern furnaces, because of the limited storage facilities and curtailed operations. The leading shipper of Cuban ore is bringing in over 100,000 tons monthly, and the other large steel interests with Cuban properties about 35,000 tons monthly.

Pig Iron.—There is less life and tone in the pig iron market, as buyers have become more receptive again and are not putting out inquiries as freely upon their own initiative. While there is considerable tonnage under negotiation in the metropolitan and nearby territory, probably 15,000 to 20,000

tons of foundry grades, most of this is not competitive business and has been worked up through the individual efforts of salesmen. Written inquiry has fallen off considerably. Buyers appear rather listless to the market unless their attention is attracted by a low quotation, and as some furnace interests are showing a little more resistance to naming or accepting bottom prices, the situation generally is dragging. Soil pipe interests have made additional purchases of southern iron for early shipment at $11.50, and report their ability to obtain full differentials on the lower grades or on a basis of $10.50 for gray forge. A New Jersey casting interest has finally closed on its inquiry for 2,000 tons of basic, and there have been smaller scattering purchases. One large consumer is holding open its inquiry for 5,000 tons, and the leading pump interest continues in the market for iron for Buffalo. Several other very fair-sized lots are being privately negotiated. Prices on standard grades of eastern Pennsylvania foundry irons are practically unchanged, ranging from $16.50 to $16.75, delivered, but on some less preferred grades from that territory and on some brands from outside districts $16.25, delivered, is being done. New England consumers are showing a little more buying activity and the market there rules about $17.00, delivered, for No. 2X, while $16.75, delivered, has been done to some points by water shipment. In Virginia, $13.75, furnace, for No. 2X for early shipment, has been done, as well as $13.00, furnace, on basic for eastern shipment. A cargo of 3,000 tons of English low phosphorus iron is expected shortly at Baltimore, and is being offered for sale at around $22.00, seaboard. We quote, delivered at New York tidewater, for prompt and third quarter shipment, as follows:

Northern foundry No. 1	$16.75 to 17.25
No. 2X foundry	16.25 to 16.75
No. 2 plain	15.75 to 16.25
No. 2 Virginia	16.80 to 17.00
No. 2 southern foundry	15.75 to 16.25
Malleable	16.75 to 17.25
Gray forge	15.25 to 15.50

Ferro-Alloys.—A western Pennsylvania steel interest has closed for about half of its inquiry for spiegeleisen or about 7,500 tons for delivery up to March 1, 1911, at a price understood to have been under $24.50, seaboard. It is generally believed that resale material figured in this transaction. German makers have been offering spiegeleisen under $25, seaboard. A Pittsburg independent steel interest has closed for a considerable lot of ferro-manganese exceeding 2,000 tons for first half shipment, at a price close to $39, seaboard, and will probably make additional purchases soon. All the large consumers of ferro-manganese are covering upon their requirements by degrees because of the low prices prevailing and other large inquiries are expected to come out soon. Ferro-silicon is dull. We quote 80 per cent ferro-manganese from $39 to $40, seaboard, to cover all deliveries, and 50 per cent ferro-silicon at from $56.50 to $57.50, seaboard.

Cast Iron Pipe.—Bids are being taken this week on 2,800 tons of 8 to 24-inch pipe for a high pressure line for Manhattan and 1,100 tons of 36 and 48-inch pipe for Manhattan and the Bronx. The market continues rather slow in both private and public work. We quote, 6-inch pipe from $24 to $25, f. o. b. New York, in carload lots.

Finished Material.—It cannot be said that there is any evidence of marked changes in the finished market. The tonnage coming out from various sources continues fairly constant, renewed activity here and there compensating for some declines. Prices appear to be less tightly held, and there are reports of greater concessions being made; especially in plates and shapes. In the former, 1.40c, Pittsburg, is understood to have been made for western shipment. The eastern plate market is about on the 1.45c, Pittsburg, basis, or at mill prices in that section of from 1.55c and upward. In some cases 1.50c, eastern mill, has been done. Some desirable business in structural material is bringing out 1.40c, on plain shapes. Low prices continue to be made on bar iron. The structural tonnage being placed is not so heavy, but there is a large accumulation under negotiation and sellers are endeavoring with varied success to obtain releases upon these lots. Considerable new work is coming out, much of which is in small jobs. The railroads are placing very little work. Contracts placed in the week include 1,300 tons to T. H. Brooks & Co., Cleveland, for the National Carbon Co. plant at Niagara Falls; 1,000 tons to C. G. Patterson, a local fabricator, for the columns and a portion of the steel requirements of the Daniels and Fisher building, Denver; 450 tons to the American Bridge Co. for a building for the Milwaukee Electric Co., at Milwaukee; 400 tons to Vierling & McDowell, for a Y. M. C. A. building at Gary, Ind.; 300 tons to the Massillon Bridge Co. for a shop for the Niagara Machine & Tool Co., Niagara Falls; 500 tons to G. W. Jackson for the Halsted Street Bank building, Chicago; 100 tons to the Boston Bridge Co., for the Boston Elevated Railway; 180 tons to the Eastern Steel Co., for a Pennsylvania Railroad bridge at Bristol, Pa., and 400 tons for the Canton Sheet Steel Co., Canton, O., the disposition of which is not announced. Among the new work pending are 3,300 tons for the Great Lakes building of the University at Chicago, and 1,500 tons for a city hall at Oakland, Cal. In New York City, the Hay Foundry & Iron Works has taken 800 tons for the McGraw building, on West Thirty-ninth street, and the American Bridge Co., 450 tons for an office building for the Pullman Co., at Madison avenue and Forty-fourth street. The 1,600 tons for the building at Dutch and John streets, for which the Thompson-Starrett Co. has the general contract, has been placed and is understood to have gone to Levering & Garrigues.

Interest in the structural market has been aroused by the report that a new union station will be erected at Cincinnati. When this project is carried out it is estimated by steel interests that it will require about 30,000 tons of steel.

We quote, New York delivery, as follows: Angles, 3 to 6 inches x ¼ inch and heavier, 1.61c to 1.66c; beams, 3 to 15 inches, 1.61c to 1.66c; tees, 3 x ¼ inch and heavier, 1.61c to 1.66c; plates, carload, tank, 1.61c to 1.71c; boiler steel, 1.86c to 1.91c; marine boiler, 2.16c to 2.21c; bar iron, 1.35c to 1.45c; soft steel bars, 1.61c to 1.66c.

Old Material.—Scarcely enough sales are being made at this time to establish values in old material. The market is in the slough of the usual mid-summer dullness when plant operations are being checked or curtailed for repairs, and consumers are in practically no need of material. Unless concessions are given, little buying is current, and offers of users are so low as to be merely nominal. Some sales of long yard wrought have been made at $15.50, delivered. Borings continue to enjoy more strength and in some cases have brought advances over turnings. Another cargo of Panama scrap has arrived and is being offered to the trade. We quote gross tons, prices New York dealers will pay at tidewater, with the exception of cast scrap, which has a local demand, as follows:

Old steel rails (rerolling)	$14.50 to 15.00
Old car wheels	13.50 to 14.00
Old iron axles	21.50 to 22.00
Old steel shafting	16.50 to 17.00
Heavy melting steel	12.50 to 12.75
No. 1 R. R. wrought	14.50 to 15.00
Iron track scrap	14.00 to 14.50

Wrought pipe	12.50 to 13.00
Cast borings	6.75 to 7.00
Wrought turnings	7.00 to 7.50
Heavy cast scrap	13.50 to 14.00
Railroad malleable	13.00 to 13.50
Stove plate	9.00 to 9.50
Grate bars	10.50 to 11.00

ST. LOUIS.

Pig Iron Extremely Dull, With No Prospect of Early Improvement.

July 4.

Pig Iron.—Local sales agents freely admit that last week was one of the dullest they have ever experienced in the pig iron business in the St. Louis territory, with very little in sight to justify a feeling of encouragement. The only sales reported were for small lots, for prompt shipment, and inquiries are about on a par with the sales. Prices are by no means demoralized, but it is somewhat difficult to ascertain the exact figure at which southern No. 2 could be bought. The usual quotation is $11.50. Northern iron is seldom, if ever, quoted at more than $15, Ironton basis, and a better price doubtless could be made. Inquiries for northern iron were small and few last week.

Our prices for southern No. 2, Birmingham basis, with freight of $3.75 to be added for delivery, and these prices are more nominal than otherwise, follow:

Southern No. 1	$15.75 to 16.25
Southern No. 2	15.25 to 15.75
Southern No. 3	14.75 to 15.25
Southern No. 4	14.25 to 14.75

Coke.—Sales of coke were small and few last week, and inquiries in the market are about in the same catagory. The only deals that looked like real business were inquiries calling for the closing up of one or more annual contracts, and these have not been consummated. Prices are about as follows, f. o. b. ovens: Connellsville 72-hour foundry coke, $2.25 to $2.50; Connellsville 48-hour furnace coke, $2 to $2.25; Virginia 72-hour foundry, $2 to $2.25; Virginia 48-hour furnace, $2 to $2.25. The freight to East St. Louis and St. Louis remains at $2.80, and $2.70 from Virginia fields when shipment is destined beyond St. Louis.

Finished Material.—We quote the following base prices, St. Louis, out of stock: Tank plates, ¼-inch and heavier up to 72 inches wide, $1.95 to $2.05; from 72 inches to 96 inches, $2.05 to $2.15; sheets, No. 10, blue annealed, $2.30 to $2.40; bar iron, $1.85 to $1.95; soft steel bars, $1.95 to $2.05.

Old Material.—With virtually no transactions recorded last week, scrap iron prices remain nominally as follows:

Old car wheels	$16.00 to 16.50
Old iron rails	16.00 to 16.50
Rerolling rails (4 ft. and over)	15.25 to 15.75
Old steel rails (2 ft. and under)	13.00 to 13.50
Light section relayers, 45 lbs. and under, subject to inspection	21.00 to 23.00
Relaying rails, subject to inspection	24.50 to 25.00
Frogs, switches and guards	12.50 to 13.00
Heavy melting steel	12.00 to 13.00
Shoveling steel	12.00 to 12.50

We quote, net tons, as follows:

No. 1 R. R. wrought	$12.75 to 13.25
No. 2 R. R. wrought	11.50 to 12.00
Arch bars and transoms	16.00 to 16.50
Knuckles, couplers and springs	12.00 to 12.50
Shafting	15.50 to 16.00
Iron car axles	19.00 to 20.00
Steel car axles	19.00 to 20.00
Locomotive tires	16.00 to 16.50
No. 1 country wrought	11.00 to 11.50
Pipes and flues	9.75 to 10.25
No. 1 cast 150 lbs. and less	13.00 to 13.50
No. 1 busheling	11.00 to 11.50
No. 2 busheling	8.00 to 8.50
No. 1 boiler cut	9.75 to 10.25
Boiler punchings	10.25 to 10.75
Cast and mixed borings	5.75 to 6.25
Machine shop turnings	8.00 to 8.50
Railroad malleable	11.00 to 12.00
Agricultural malleable	9.50 to 10.00
Stove plate and light cast scrap	10.00 to 11.00
Angle splice bars, iron	15.00 to 15.50
Angle splice bars, steel	14.00 to 14.50

BUFFALO.

More Pig Iron Inquiries Out.—Less New Buying of Finished Material.

Office of THE IRON TRADE REVIEW,
932 Ellicott Square, July 5.

Pig Iron.—During last three days of last week a decided increase in inquiries was noticed following the dullness of the earlier half of the week. The inquiries were mostly for the foundry grades. It is estimated that the inquiries that have come in lately amount to between 7,000 and 8,000 tons besides a considerable tonnage still under consideration reported earlier. The inquiries have been for small quantities, not exceeding 500 tons. It is reported that heavy purchasing has been going on quietly in this territory for third quarter and last half delivery, but the tonnage thus placed cannot be ascertained. The prices are a little lower than last week on all grades. We quote gross tons f. o. b. furnace:

No. 1X foundry	$15.75 to 16.25
No. 2X foundry	15.25 to 15.75
No. 2 plain	15.00 to 15.50
No. 3 foundry	14.75 to 15.25
Gray forge	14.50 to 15.00
Malleable	15.00 to 15.75
Basic	15.50 to 16.00
Charcoal	18.75 to 19.25

Finished Product.—The state of the stock market last week is given as the cause for unsettled conditions in this territory. While specifications have not diminished, new buying has been checked to some extent, but it is believed the lack of activity will be of short duration. A couple of structural jobs calling for large tonnage have been let, and others are pending. One is the plant which the National Carbon Co., Cleveland, is to build at Niagara Falls, calling for about 1,000 tons, which has been awarded to T. H. Brooks & Co., Cleveland. Another is the Simons Mfg. Co. plant at Lockport, awarded to the Kenwood Bridge Co., Chicago, which it is reported will require between 1,000 and 1,200 tons. Bids are being received for a bridge which the Syracuse, Lake Shore & Northern Railroad will build across the Barge canal and Oswego river at Fulton, N. Y., requiring about 600 tons. Contracts are to be let at once for the new buildings of Canisius college, Buffalo, costing $500,000, three stories, fireproof.

Old Material.—Business in old material continues dull and there are few signs of improvement. No sales of any size have been reported. The prices here given are nominal. We quote, gross tons, f. o. b. Buffalo, as follows:

Heavy melting steel	$13.00 to 13.25
No. 1 railroad wrought scrap	14.00 to 14.50
No. 1 railroad and machine cast scrap	12.75 to 13.25
Old steel axles	17.00 to 18.00
Iron axles	22.50 to 23.00
Car wheels	14.00 to 15.00
Railroad malleable scrap	13.00 to 13.50
Machine shop turnings	7.00 to 7.50
Cast iron borings	5.00 to 5.50
Low phosphorus steel scrap	18.00 to18.50
Old iron rails	16.00 to 16.50
Tank iron	11.00 to 11.50
Sheet iron	7.50 to 8.00
Stove plate	11.50 to 12.00
Pipes and flues	11.00 to 11.50
Grate bars	10.50 to 11.00
Boiler plate	11.75 to 12.25

METAL MARKETS.

NEW YORK.

July 5.

Copper.—With the exception of some slight improvement in the export movement during the last few days of June, copper metal market conditions are unchanged from last week. The total exports for the month are about 51,000,000 pounds, which exceeds the total that was generally expected by about 6,000,000 pounds. Up to the beginning of the holidays there was a good consumption demand, but it was not of sufficient volume to advance prices, and at the opening today the market was not inclined to advance on a reduced volume of business. Electrolytic sold on a 12.40c basis, delivered 30 days, and 12.30c, f. o. b., for foreign shipment. Lake copper is quoted at 12.75c-12.87½c, and casting at 12.25c-12.37½c. The London market showed some improvement at the opening, but closed dull and lower at £54 13s 9d for spot, and £55 6s 3d for three months. Exports since July 1 are 3,502 tons.

Tin.—Notwithstanding the strong

statistical position of pig tin, as shown by the figures for June, the market failed to hold all of the advance made last week. The statement compiled by Secretary Meyer of the metal exchange, shows that deliveries into domestic consumption during June were 5,000 tons, and that the total for the six months of 1910 exceeds by 3,700 tons the total deliveries for the corresponding period of 1909. The combined deliveries for London and Holland in June, 1910, exceeded by 513 tons the deliveries for June, 1909. Shipments from the Straits were 618 tons less than for the same month last year, and for the six months period of this year they were 2,055 tons less than the first half of 1909. Spot and nearby tin closed in the local market at 32.90c-33c. The London market closed steady, spot at £150 2s 6d, and three months at £151. Arrivals since July 1 are 670 tons, and there are 2.165 tons afloat.

Lead.—The market for pig lead is firm, with very little business being done. All positions up to and including September can be had at 4.40c in New York.

Spelter.—The spelter market continues quiet and prices are unchanged. Prime western cannot be had under 5.25c in New York.

Antimony.—The market is unchanged in any feature. Cookson's, 8.25c; Hallett's, 8.17½c, and Hungarian, 7.37½c.

ST. LOUIS.

July 4.

Lead and Zinc.—With spelter closing at $5.10, East St. Louis, as compared with $4.97½ for the previous week, zinc blende in the Missouri-Kansas-Oklahoma district last week rose to a top price of $44 a ton, with 60 per cent qualities ranging down to $41 and $38 a ton. The average price was $38.72, compared to $39.46 for the previous week. Pig lead was quoted at East St. Louis at the close of the week at $4.25, compared to $4.22½ the week before.

Calamine remained unchanged at Joplin, selling at $22 to $24 a ton on a 40 per cent basis, with choice lots bringing as much as $27.60. The average price for calamine was $22.84 a ton, compared with $22.24 the week before.

Lead ore sold for $49 a ton, with an average price of $48.71, compared to $48.82 the week before.

Zinc ore was reduced in the district about 1,560 tons, and lead ore about 133 tons, giving rise to the belief that a strong demand will continue for both ores throughout the present week.

CHICAGO.

July 5.

New Metals.—The metal market continues quiet with the tone bordering on weakness. Transactions in copper are not heavy and prices are nominal at figures previously quoted. The shutting down of sheet mills at the first of the month reduced the demand for spelter, but prices are a shade higher for that metal. The expected advance in tin prices has not as yet taken place, although it is still looked for by some who think that speculative conditions seem favorable for an advance.

We quote as follows: Lake copper, carload lots, 13c to 13⅛c; casting, 12¾c; smaller lots, ¼c to ⅜c higher. Spelter, car lots, 5.10c to 5.15c; lead, desilverized, 4.20c to 4.25c, in 50-ton lots; corroding, 25c per 100 pounds higher; sheet zinc, $7.50 list, f. o. b. La Salle, in car lots of 600-pound casks; pig tin, 33½c; Cookson's antimony, 10½c; other grades, 9¾c to 10¼c.

Old Metals.—The scrap metal market is very dull with not enough trading to establish anything other than nominal quotations.

We quote, dealers' selling prices, as follows:

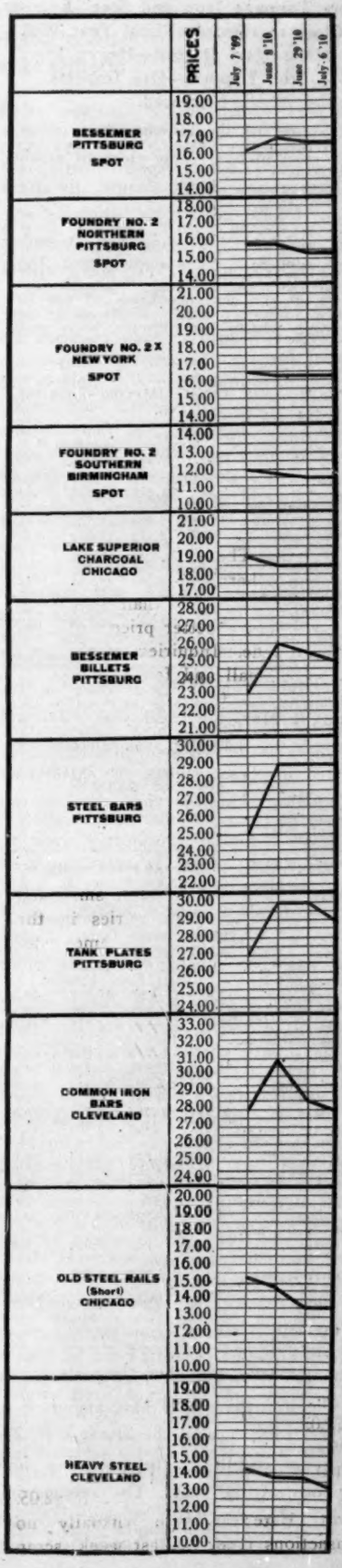
Copper wire, 12¼c; heavy copper, 12¼c; light copper, 10¼c; heavy red brass, 11c; heavy yellow brass, 9c; light brass, 6½c; No. 1 red brass borings, 9¼c; No. 1 yellow brass borings, 7¼c; brass clippings, 8¼c; tea lead, 3.60c; lead scrap, 3.85c; zinc, 3¾c; tin pipe, 30c; tin foil, 27½c; pewter, 22c; electrotype plates, free from wood, 4¼c; electrotype dross, 3c; stereotype plates, 4½c; stereotype dross, 3¼c; prime slab zinc dross, $75.00 per ton.

EMPLOYES GIVEN MEDALS.

The Verona Tool Works, Pittsburg, a few days ago rewarded four employes for long and faithful service by presenting them gold medals and life pensions. The formal presentation was made the occasion of a pretty and interesting ceremony. One of the men so honored was the first man employed by the company, and had been employed continuously for 37 years as a tool steel temperer; another had been employed for 36 years; another for 35 and a fourth for 29 years.

No. 3 stack of the Ohio works blast furnace group of the Carnegie Steel Co., at Youngstown, O., was relighted June 29, after being relined. For the first time this year all six stacks of the Ohio works are now blowing.

PRICE CHART



OUR FOREIGN COMMERCE.

May Tonnage Iron and Steel Exports Close to Record—Fiscal Year Will Make New Record—Heavy Pig Iron Imports—Ore Imports Increased.

Exports of the tonnage lines of iron and steel in May came close to making a new record for a month, the total being 135,305 gross tons, which is second only to the total for December last, 137,688 tons. The May exports were 20 per cent in excess of the best average which has hitherto been maintained for a year.

IRON AND STEEL IMPORTS—GROSS TONS.

	May,		Eleven months, ending May,	
	1909.	1910.	1909.	1910.
Scrap	642	3,253	5,132	116,370
Pig iron	8,747	21,405	94,032	223,606
Billets, bars and steel n. e. s.	1,008	3,835	11,524	34,797
Wire rods	692	2,174	10,523	14,041
Rails	6	540	1,292	6,844
Structural	63	1,915	5,384	10,157
Bar iron	501	4,305	14,051	29,962
Sheets and plates	160	460	2,978	6,424
Tin plates	6,488	7,087	46,725	63,553
Totals	18,307	45,024	191,638	505,754

If June exports come close to the rate of May, the fiscal year total will exceed the 1,400,000 tons already estimated in these reports, or 75,000 tons more than in any previous fiscal or calendar year.

IRON AND STEEL EXPORTS—GROSS TONS.

	May,		Eleven months, ending May,	
	1909.	1910.	1909.	1910.
Scrap	3,819	3,687	21,192	14,508
Pig iron	5,121	7,814	42,332	70,917
Billets, sheet bars, etc.	13,981	180	98,757	49,313
Wire rods	1,427	1,835	11,196	22,443
Rails	30,794	35,516	213,315	344,186
Structural iron and steel	5,643	15,750	92,654	104,472
Bar iron	1,297	2,057	10 536	14,644
Steel bars	4,763	8,201	45,461	81,062
Sheets and plates	13,881	22,106	121,787	216,818
Tin plates	641	1,461	4,465	10,918
Hoop, band and scroll	269	600	3,213	4,659
Barb wire	4,645	7,350	60,163	67,854
All other wire	8,717	8,234	63,662	73,010
Wire nails and spikes	1,581	4,997	24,350	34,094
Cut nails and spikes	848	1,032	7,034	8,449
All other, including tacks	593	1,185	6,088	7,666
Pipes and fittings	11,788	13,301	118,312	150,779
Totals	109,808	135,306	944,517	1,275,792

Heavy Pig Iron Imports.

Pig iron imports in May amounted to 21,405 tons, against an average of 21,165 per month in the preceding four months of the year. The average imports last year were 12,000 tons per month, of which about 4,000 tons was ordinary pig iron, leaving 8,000 tons per month for ferro-manganese, spiegeleisen, ferro-silicon, etc. This year there have been no important imports of ordinary pig iron, so that the manganese and other special irons must be coming in at much greater rate than last year. The official report gives separate figures for the United Kingdom, Austria-Hungary, Germany and other Europe. China comes under "other countries," which showed 1,570 tons in May and 8,874 tons in the 11 months ending May. The first full cargo of ore and pig iron from China for the Western Steel Corporation did not arrive until June 29.

Ore Imports.

Iron ore imports showed a gain in May over any of the three preceding months, partly by an increase from Cuba, and partly by imports from British North America, reaching important proportions. Our iron ore imports have been as foollows:

1903	980,440
1904	487,613
1905	845,651
1906	1,063,390
1907	1,229,168
1908	776,898
1909	1,696,411

	1909.	1910.
January	105,233	284,823
February	61,749	170,427
March	108,676	163,633
April	74,782	206,135
May	97,393	240,833
June	124,714	.....
July	172,316	.....
August	209,855	.....
September	164,613	.....
October	179,505	.....
November	174,976	.....
December	222,609	.....
Totals	1,696,411	1,065,851

The sources of our iron ore imports have been as follows, for the calendar year 1909 and the first five months of this year:

	Year, 1909.	Five months, 1910.
Europe	464,065	338,291
British North America	251,550	52,630
Cuba	927,774	638,630
Other countries	53,022	36,300
Total	1,696,411	1,065,851

Building New Stack.—The construction of the new No. 2 blast furnace of the Worth Bros. Co., Coatesville, Pa., is proceeding steadily and this stack is expected to be completed about the latter part of the present year. The No. 1 furnace, which was recently completed and blown in, is now in active operation.

The Central Iron & Coal Co. blew out its Holt, Ala., blast furnace, June 15, for relining.

NEW FURNACE

Will Take Place of Isabella No. 2—Purchase of Spiegeleisen.

New York, July 6. (By wire.)

Isabella No. 2 furnace of the Carnegie Steel Co., at Pittsburg, which has been blown out, will be torn down and replaced by a new and modern stack. The United States Steel Corporation continues to make moderate curtailment of its pig iron output and now has 35 furnaces out of a total of 119 in idleness. Pig iron stocks among merchant and non-merchant interests in Pittsburg and middle western valley territory have increased very slightly in the past several weeks.

A western Pennsylvania steel interest, which bought 7,500 tons of spiegeleisen last week, closed for an additional lot of 7,500 tons Tuesday, or 15,000 tons in all, which was purchased close to $24, seaboard duty paid. Carload sales of 50 per cent ferro silicon at $57, seaboard, are noted.

The American Locomotive Co. has taken an order for ten Mallet compound locomotives from Central and South American railways and booked orders for nine other locomotives from different interests this week.

TO START ROD MILLS.

The Jones & Laughlin Steel Co. expects to put its new wire rod mills at Aliquippa, Pa., in operation about the middle of July, and it is now booking business against this capacity for August delivery. The new wire mills will not be completed until some time later, and it is now thought that these will scarcely be in shape to allow finished products until about Oct. 1. The new wire and wire rod mills make the Jones & Laughlin Steel Co. a factor in the wire business for the first time.

IMPROVING COKE PLANT.

The Woodward Iron Co. has just completed installing the Covington coke pulling and loading equipment at the Woodward, Ala., bee-hive ovens. The construction work has been under way for several months. It is said that other coke plant operators in the Birmingham district are planning to install the mechanical equipment.

EUROPEAN VISIBLE COPPER.

The visible supply of copper in Europe is reported at 103,980 tons, as compared with 105,380 tons on June 15; 106,760 tons on June 1; 110,207 tons on May 1, and 76,559 on July 1, 1909.

CENTENNIAL OF THE LUKENS IRON & STEEL CO.

Appropriate Celebration of the Founding of a Great Industry at Coatesville, Pa.—Parade of Workingmen — Historic Addresses by President Huston, John Fritz and Others.

In the presence of iron masters of both the old and the modern schools, of distinguished guests, and of hundreds of employes and townspeople, the centennial anniversary of the founding of the plant of the Lukens Iron & Steel Co., at Coatesville, Pa., and of approximately the ninetieth anniversary of the rolling of the first boiler plate in the United States, was fittingly celebrated with impressive ceremonies at Coatesville, Saturday, July 2. The event was a gala occasion for the city of Coatesville and public and private buildings and residences were bedecked with flags and bunting. Hundreds of out-of-town visitors were in attendance.

The invited guests were received by A. F. Huston, president; C. L. Huston, vice president, and other officials of the company upon the beautiful and spacious grounds of the residence of A. F. Huston, where luncheon was served at tables set upon the lawn under the spreading trees. From there the guests viewed the parade of the workmen of the plant, from 1,200 to 1,500 strong, which moved through the grounds and then through the principal streets of Coatesville, disbanding at the selected spot upon the banks of the Brandywine, where had been erected the speakers' stand for the occasion. At the head of the procession rode several of the oldest former employes of the mills, some of whom have been upon the pay roll of the company for almost 50 years. As the guests, parading workmen and hundreds of the citizens of Coatesville gathered for the afternoon's program of addresses, a noisy and prolonged salute was given by the whistles of the Coatesville Rolling Mill Co. nearby and of the other mills of the Worth Bros. Co.

The ceremonies were opened by Dr. Geo. M. Phillips, principal of the state normal school at West Chester, Pa., and president of the Chester County Historical Society, under the joint auspices of which organization and the Lukens Iron & Steel Co., the centennial exercises were given. Invocation was pronounced by Charles L. Huston, vice president of the Lukens company.

Dr. Phillips in his address of welcome told briefly of the organization of the Chester County Historical Society in 1893 for the purpose of preserving the early records of Chester county and its people. Referring to what the society has done toward perpetuating the early history of iron-making of the community, Dr. Phillips said:

Last fall, while some of the members of the society were returning from the Fulton celebration in Lancaster county, former Governor Pennypacker called their attention to the importance of the early iron industries of Chester county, and suggested the propriety of marking some of their sites and of acquainting the public with their interesting history. When, therefore, it was announced that the Lukens Iron & Steel Co. would this summer celebrate here the centennial anniversary of the plant where boiler plate was first rolled in America, it seemed to the members of the society that this was so important an occasion, and this place so suitable for a celebration, that it would be wise to commemorate in connection with it, some of the other early important iron industries of the country.

And it is for this purpose that we are gathered here today. Here on the site of the old mill where this important industry began, in the heart of this great plant, the society has permanently erected a bronze tablet, bearing this inscription:

THE SITE OF MILL
WHERE BOILER PLATE WAS
FIRST ROLLED IN UNITED STATES
BY DR. CHARLES LUKENS
ABOUT 1820.

And at Coventryville, in the northern part of the county, we are also marking suitably and substantially the site of Coventry Forge, started in 1717, the first forge in Chester county, and the second in Pennsylvania, where Mordecai Lincoln, the great-grandfather of Abraham Lincoln, worked as a blacksmith, and in which he was a partner.

A few miles further west, in Warwick township, we are also marking in the same way, Warwick Furnace, built in 1737, where the Franklin stoves were first made, and where cannon and cannon balls were made for the use of the Americans in the Revolutionary war, and in Phoenixville, Coatesville's only rival in the county as a great iron town, the society will next week, during that town's Old Home Week celebration, dedicate a bronze tablet similar to the one erected here, bearing the following inscription:

Near this point is the site of the
Rolling Mill where, in 1783, was rolled
the first iron in Phoenixville.
Marked by the Chester County Historical Society, 1910.

It is not my purpose, nor my part on the program, to recite the interesting history of these early and later industries, but I do wish to call attention to the important and interesting fact that, so far as I can recall, every one of the most important industries and institutions of every kind now carried on in Chester county, and there is a considerable number of them, has been built up and is carried on, not by strangers, but by men who are descended from Chester county families, and usually from the old families of the county.

A touch of the early days of iron-making, to the commemoration of which the exercises were devoted, was lent the occasion by the presence of John Fritz, the veteran iron manufacturer of Bethlehem, Pa. Despite the extremely hot weather and his advanced age of 88 years, Mr. Fritz took the place assigned to him upon the program and partially read a paper prepared by himself, upon his reminiscences of the early iron and steel industry of this country in which he had played so important a part. The venerable iron master was tendered a most hearty welcome when he appeared upon the platform to address those assembled.

In his paper, Mr. Fritz told of the early difficulties and tribulations of the characteristic style. His address will be published in these columns next week.

Women and the Tariff.

Early tariff troubles formed the topic of some picturesque memories recalled in the address of A. F. Huston, president of the Lukens Iron & Steel Co., which embodied a historic sketch of the founding and development of the company. Mr. Huston dwelt largely upon the history and incidents of the company's growth, which were covered completely in the article published in THE IRON TRADE REVIEW in its issue of June 30. Referring to the part which the ladies of his family have taken in the tariff struggles, Mr. Huston said:

It may be interesting to note that early in the period of iron manufacture the tariff was an absorbing topic and meant either prosperity or adversity according to the laws enacted. In the campaign of 1840 when Benjamin Harrison was a presidential candidate, the ladies of Coatesville including my mother took an active part; they made a silk banner to carry at the head of parades. Harrison had fought at the battle of Tippecanoe and so was called "Old Tip." The silk banner bore the following inscription composed by my grandmother, Rebecca W. Lukens:—

Let patriots from each wooded height,
And freemen, from our fair vale, come
To rear this banner broad and bright,
And rally round brave Harrison.

Unfortunately Pres. Harrison lived

only a short time after his inauguration and was succeeded by Vice President Tyler, who disappointed the party that elected him and played into the hands of the opposite party.

To quote from my mother's writings concerning the next campaign she says, "The campaign of 1844 is also cut like a cameo in my memory. I suppose it is because I was young and enthusiastic. Henry Clay was then running for president. We in the iron business had passed through very dull times, the men only working half turn; that is, only in the day time. All was unsettled about the tariff then as it is now, and in fact has been ever since. The men of the rolling mill then known as Brandywine, now Lukens mills, wanted to march in procession with their banner, which was a large sheet of iron set on a pole; on it was painted in white the inscription composed for the occasion by my mother,

"We fondly hope for better days,
When every furnace fire shall blaze,
And streaming to the midnight sky
Proclaim to all 'prosperity.'"

At that time fuel saving devices were not used and great volumes of flame came from the chimney tops. To continue the above quotation from my mother's letter, "But nevertheless we lost our President-elect, the gifted Henry Clay, James K. Polk in order to win Pennsylvania had written a double-tongued letter on the tariff that sounded well on the subject and that was made capital of by his party here, while elsewhere it bore another meaning, so they raised the cry of 'Polk, Dallas and the tariff of '42,' and asserted that Polk was a better tariff man than Clay, but as soon as the election was over and the Democrats came into power they reduced the duty so much on foreign merchandise that a period of great depression followed, commencing in 1846 and lasting several years."

During Mrs. Lukens' time the total output of the mill was under 500 tons per year; in 1875 the output was 2,135 tons; in 1890, 14,390 tons, in 1900, 64,700 tons; and for the last twelve months—to July 1, 1910, it was over 225,000 tons.

Former Governor Samuel W. Pennypacker, of Pennsylvania, president of the Historical Society of Pennsylvania, who has made a close study of early iron-making in Chester county and eastern Pennsylvania from old business documents and records now in his possession, contributed some valuable and interesting information in his address. After emphasizing the importance of iron-making in the world's history of civilization and prosperity, the speaker said: "And it is an evidence of a lack of appreciation of us as a people that we know nothing of him who first discovered iron—who he was or where he had lived."

Ex-Governor Pennypacker declared that the early papers in his possession show clearly that steel was made in Chester county early in the eighteenth century and a number of years prior to the date at which, the claim has been advanced that the first steel in the United States was made in Connecticut. This manufacture took place at Coventry Forge, which was established in 1717, by Thomas Rutter and Thomas Potts at what was known as Cole-Brookdale in the northern part of Chester county and within a short distance of the present city of Pottstown, Pa. The founders of this forge learned of the presence of iron ore in that locality from an Indian chief and it is related that the latter was presented an iron pot made at the forge for his part in the enterprise. It was in this forge that Mordecai Lincoln, the great-great-grandfather of Abraham Lincoln, was interested as a partner. The Warwick furnace in Warwick township, Chester county, a few miles west of Coventry Forge, was built in 1737 by Samuel Nutt, who named it after his birth-place in England. Here were cast iron cannons and cannon balls for the Colonial army in the war of the Revolution and also were made the famous stoves which have become known to posterity as the Franklin stoves. Governor Pennypacker declared that in no particular, did his documents support the generally-accepted statement that these stoves were called "the Franklin stoves" at that time. These stoves were sent to the market in Philadelphia and Benjamin Franklin was one of the several persons who engaged in selling them. In 1740, the most famous of all eastern Pennsylvania forges was started by one Walker, who had worked at the Warwick furnace. This was first known as Mt. Joy and later as Valley Forge and as such it now occupies a prominent and reverent place in American history. The speaker displayed a household article of primitive days, which was manufactured at Coventry Forge. This was a small hatchet-like implement for cutting and piercing button-holes in the homely pursuit of making buckskin breeches.

Congressman Thomas S. Butler, of the local district, was the final speaker of the afternoon. He paid a high tribute to the business ability and courage symbolized in the 100 years' development of the Lukens Iron & Steel Co., and complimented both employers and employed upon the evidence of most harmonious relations.

Tablet is Unveiled.

Following the addresses, the ceremonies were adjourned to the mill yard where was unveiled the bronze tablet, commemorating the centennial of the founding of the works and of the ninetieth anniversary of the rolling of the first boiler plate in the United States. Charles Lukens Huston Jr., the young son of Charles L. Huston, vice president of the company, drew the flags from the bronze plate. The tablet is mounted upon a stone shaft in the mill yard within a few feet of the surviving portion of the original mill building.

STEEL BRIDGES

Will be Built for Railroad by McClintic-Marshall Co.

A bridge contract to cover steel structures has just been awarded by the Western Maryland railroad to the McClintic-Marshall Construction Co., of Pittsburg. The bridges will cost in the aggregate approximately $1,000,000, will be the heaviest of their kind in this section of the country, and will go up on the new extension of the road from Cumberland, Md., to Connellsville, Pa. Their designs were prepared by H. R. Pratt, chief engineer of the Western Maryland. The first bridge is to be completed by October and the entire order delivered within a year. The bridges were designed for the heaviest type of Mallet engines and other heavy hauling. The longest will be about three-quarters of a mile and 100 feet high, and will be erected at Salisbury Junction, just west of Myersdale, Pa.

GOODNOW CO. FILLS STRIKERS' PLACES.

The Goodnow Foundry, Fitchburg, Mass., announces that the strike of its molders and coremakers has been defeated and that it is now working with a full force. The molders demanded $3 a day and the coremakers recognition and a uniform scale of $2.75 a day. The Goodnow company says it is paying some of the men who remained $3.50 a day.

Congressman Eugene N. Foss, head of the Sturtevant Blower Works, Boston, this week refused to grant the demands of the stationary engineers of the plant for an eight-hour day.

ST. LOUIS SHIPMENTS.

Receipts and shipments of pig lead and spelter at St. Louis for the last two weeks were as follows:

	Zinc and spelter.	Pigs of lead.
Receipts—		
For week ending June 25.....	63,020	62,870
For week ending July 2.....	77,740	39,000
Shipments—		
For week ending June 25.....	77,200	36,620
For week ending July 2.....	67,830	21,000

The total output of copper in Russia in 1909 was 40,209,120 pounds, an increase of 30,859,164 pounds over 1908.

HEAVIEST HALF-YEAR PRODUCTION IN HISTORY

Complete blast furnace returns of production in June showed a surprisingly small reduction in the output. The total production of coke and anthracite iron in June was 2,291,094 tons, compared with 2,374,802 tons in May, a reduction in June of 83,708 tons. The average daily production in June was 76,369 tons, compared with 76,607 tons in May, the latter having one more working day. Compared with an ordinary daily average, this reduction in June of less than 300 tons a day was almost a negligible quantity.

AVERAGE DAILY PRODUCTION.

	1910.	1909.
January	83,871	57,683
February	86,747	60,088
March	83,508	58,793
April	82,590	57,687
May	76,607	60,218
June	76,369	64,334
July	.....	67,375
August	.....	72,021
September	.....	79,186
October	.....	84,001
November	.....	84,425
December	.....	86,539

The output of coke and anthracite pig iron in June closes the first half of the year 1910 with a total production of 14,761,264 tons, compared with 10,820,672 tons for the first half of 1909; 6,789,463 tons for the first half of 1908; and 13,213,704 tons for the first half of the "boom" year 1907. In other words, the first half production in 1910 exceeded that of the first half of 1907 by 1,547,560 tons. It surpassed the total production for the first half of 1909 by 3,940,592 tons; and more than doubled the total production for the first half of 1908.

The net decrease in the list of active blast furnaces was eight stacks. Ten blast furnaces blew out in June, while two blew in. The reduction was more noticeable among the steel plant furnaces than merchant. In June the production by merchant stacks showed a reduction, as compared with May, of 24,208 tons, while the steel plant furnaces showed a reduction of roughly three times this quantity or 60,810 tons. The production of spiegel in June was 14,912 tons, compared with 13,081 tons in May, an increase in June of 1,831 tons. However, the production of ferro fell off slightly in June. The production of ferro in June was 18,795 tons, compared with 19,326 tons in May, a decrease of only 531 tons.

MONTHLY PRODUCTION.

	1910.	1909.	1908.
January	2,599,995	1,788,164	1,043,374
February	2,428,937	1,682,470	1,086,809
March	2,588,736	1,822,644	1,229,856
April	2,477,700	1,730,608	1,155,122
May	2,374,802	1,866,757	1,168,002
June	2,291,094	1,930,029	1,106,300
July	.....	2,088,620	1,228,604
August	.....	2,232,642	1,366,019
September	.....	2,375,589	1,416,252
October	.....	2,604,037	1,573,824
November	.....	2,532,740	1,582,314
December	.....	2,682,702	1,723,664
Total	14,761,264	25,337,002	15,680,140

In this connection, it might be well to note, however, that since the last day of June, the owners of at least three additional blast furnaces have blown them out, while several others have signified their intention of doing so shortly. This would have a tendency to still further curtail the production in July, which, at the present time, is running on at a rate higher even than August of last year. The total production in June of this year was 361,065 tons greater than June of last year, and over twice as large as that of 1908.

JUNE BLAST FURNACE REPORT.

STATES.	NO. OF STACKS.	NO. IN BLAST ON LAST DAY OF MONTH. JUNE	NO. IN BLAST ON LAST DAY OF MONTH. MAY.	ACTUAL TONNAGE MADE. MERCHANT.	ACTUAL TONNAGE MADE. NON-MERCHANT.	TOTALS. JUNE.	TOTALS. MAY.
Pennsylvania	159	111	114	214,024	706,284	920,308	941,308
Ohio	69	53	50	166,312	298,991	465,303	484,313
Alabama	45	22	22	120,976	37,893	158,869	164,248
Virginia	24	11	12	39,781	———	39,781	43 211
New York	26	18	17	60,101	103,795	163,896	171,337
New Jersey	9	3	4	18,443	———	18,443	22,977
Illinois	26	20	22	40,967	209,286	250,253	257,029
Colorado	6	4	4				
Indiana	8	6	7	12,855	151,893	164,748	172,713
Maryland	4	4	4				
Wisconsin	6	3	2				
Kentucky	7	2	2				
West Virginia	4	1	2	42,828	12,072	54,900	63,082
Tennessee	18	11	12				
Georgia	2	1	1				
Texas	3	0	0				
Minnesota	1	1	1	20,886	———	20,886	22,187
Michigan	2	2	2				
Missouri	1	1	1				
Spiegel—All states.						14,912	13,081
Ferro—All states.						18,795	19,326
Total	420	271	279	737,173	1,520,214	2,291,094	2,374,802

BLAST FURNACE NOTES.

The Federal Furnace Co., Chicago, blew out B stack June 15.

The Wisconsin Steel Co. blew out No. 2 stack at South Chicago, July 2, for relining, which will require five or six weeks.

The Tonawanda Iron & Steel Co. relighted B stack at North Tonawanda, N. Y., June 17, after relining.

The Hanging Rock Iron Co. blew out its Hanging Rock, O., stack June 30.

The Marting Iron & Steel Co., Ironton, O., blew out Blanche stack June 20, but will relight it about July 15.

The National Tube Co. blew out Riverside, W. Va., No. 2 on June 13, the other stack having been blown out previously.

The New Jersey Zinc Co. blew out its Bethlehem, Pa., furnace June 19.

Joseph E. Thropp blew out Saxton, Pa., stack No. 2 on June 24.

The Rockdale Iron Co., Rockdale, Tenn., blew out its stack June 18 for repairs.

The Oriskany Ore & Iron Co. lighted Buena Vista, Va., stack June 3, but blew out Alleghany, Va., furnace June 10.

The Goshen Iron Co. blew out its Goshen, Va., furnace June 10 for repairs.

The Northwestern Iron Co., Mayville, Wis., blew in B furnace June 13.

The Republic Iron & Steel Co. blew out Pioneer No. 3 in Alabama June 29, and Hall furnace at Sharon, Pa., the following day.

AGREEMENT REACHED.

Pittsburg, July 6. (By wire.)

Reports from Wheeling state that an agreement has been reached regarding the check-off clause of the new wage scale between the Amalgamated Association of Iron, Steel and Tin Workers and the independent sheet tin employers. The employes of the Whitaker-Glessner mills are now paying the assessment.

NEW COMPANY

Takes Over Charcoal Iron Plants—Rogers, Brown & Co. Agents.

Papers have just been signed which transfer the property of the Lake Superior Iron & Chemical Co. to a new company of the same name incorporated under the laws of New York. Stock in the new company is apportioned between $10,000,000 common and $1,625,000 preferred. An issue of $6,500,000 in sinking fund bonds, bearing 6 per cent, is authorized at this time. Of this, stockholders in the old company receive $1,500,000, while foreign markets will dispose of $3,000,000, and $2,000,000 will go to New York. A further issue of $3,500,000 is authorized for the acquisition of further properties.

The present properties of the company comprise iron furnaces and chemical plants at Ashland, Wis., Manistique, Newberry and Elk Rapids, Mich., iron furnaces at Boyne City and Chocolay, Mich., the Yale iron ore mine at Bessemer, Mich., the Tyler Forks iron mine at Plummer, Wis., and 170,000 acres of timber land in both Wisconsin and Michigan. Extensive improvements are to be made at some of the plants.

The annual output will be: Charcoal pig iron, 198,000 tons; wood alcohol, 3,420,000 gallons; acetate of lime, 61,560,000 pounds, making a total estimated net earnings, after deducting for all allowance, of $1,383,420.

The offices of the company will be in Detroit as at present.

The board comprises F. M. Harrison, president of the United States Industrial Alcohol Co., New York; W. H. Mathews, general manager Boyne City Chemical Co., Boyne City, Mich.; John Joyce, director in Shawinigan Water & Power Co., Boston; Thomas McDougall, vice president Shawinigan Water & Power Co., Quebec; Hon. William G. Sharp, congressman, Elyria, O.; Frank W. Blair, president Union Trust Co., Detroit; H. H. Meville, vice president Canadian Northern railway, Boston; George H. Russell, president Peoples' State Bank, Detroit; Hon. William A. Charlton, lumberman, Toronto, Ont.

In the manufacture and grading of the iron it is planned to give especial attention to the requirements of makers of automobiles, cylinders, car wheels, engines, etc., and to be prepared from the various furnaces to supply a uniform metal of superior merit for each purpose.

Rogers, Brown & Co., who have heretofore represented Hinkle & Chocolay, have been appointed sole agents for the sale of all the new company's pig iron output.

IN SMALL LOTS

Pig Iron Inquiry Appears in Philadelphia District—Baldwin Works Buys.

Philadelphia, July 6. (By wire.)

This week has developed practically no change in the pig iron situation over the conditions prevailing last week and the market remains quiet with consumers acting very leisurely in the making of new purchases. The new inquiry of the past few days has been small and in lots of 500 tons and less. Cast iron pipe consumers are closing today on several thousand tons additional of the lower grades, upon which they put out inquiries last week, and there is an expectation upon their part that $10.50 on gray forge, representing the full differentials under the current $11.50 price on southern iron, may be secured. It is understood that the Baldwin Locomotive Works has closed upon its inquiry for 2,000 tons additional of the forge grade. There has been no further selling of basic.

CASTINGS CONTRACT

Let to Wheeling Mold & Foundry Co. For Panama Work.

The Wheeling Mold & Foundry Co., Wheeling, W. Va., has been awarded the contract by the McClintic-Marshall Construction Co., Pittsburg, for steel castings and other material aggregating in value more than $1,000,000, to be used in the Panama canal, for lock work, for which the McClintic-Marshall company has the general contract. The contract includes iron and steel castings, bronze, vanadium and nickel steel, and all machine work in connection with the same. Deliveries are to extend over a period of two years. The initial shipment is to be made shortly after the first of the year. It will require less than one-half the capacity of the Wheeling plant of the Wheeling Mold & Foundrry Co. to fill the contract, and this work will not interfere in any way with the company's rolling mill business.

F W. Breyer, for 12 years master mechanic for the Wisconsin Bridge & Iron Co., of Milwaukee, has resigned to become connected with Breyer Bros., Whiting & Co., of Waupun, Wis.

NEW RECORD

In Ore Shipments, Although Many Vessels Are Out of Commission.

As an evidence of the capacity of the lake fleet it is sufficient to note that the fleet moved 7,316,679 tons of ore in June, the largest movement for the month in the history of the trade, being an increase of 123,480 tons over the previous record which was made in August, 1909. Up to July 1, the fleet has moved 14,522,054 tons, a gain of 5,819,735 tons over the corresponding period for 1909, when 42,500,000 tons were moved during the entire season. It is clear that the 1910 movement can easily exceed 50,000,000 tons. The Steel Corporation is moving a considerable part of this ore, about 45 per cent of the June movement being credited to it. This movement is being accomplished with incredible ease. There is absolutely no strain on the equipment anywhere. Practically 20 per cent of the independent fleet has been tied up and probably will remain so for several weeks yet. In fact, at the present moment it cannot be seen wherein they can find employment until the fall months. Vessels are being commonly worked out in a single day of ten hours at Lake Erie docks and the tonnage at present employed is certainly sufficient for the trade offering. It does not now seem as though the reserve fleet can be called into service until heavy weather delays the movement of the vessels.

BLOWING OUT STACKS.

Birmingham, July 6. (By wire.)

Two additional furnaces have been blown out this week, one of the Southern Steel Co., at Alabama City; the other the Sloss-Sheffield Co.'s city furnace. This brings production of foundry iron down from 55,000 to 60,000 tons a month. One other stack is contemplating going out this week.

WILL ERECT A LARGE PLANT.

The Birmingham Valve & Fittings Co. will erect a half a million dollar plant at East Birmingham—work to begin within the next week or so. The officers are W. H. Stockham, president; C. C. McClarty, vice president, and James Weisel, treasurer. The company was formed by merging the Howe Mfg. Co., Louisville, and the Stockham Pipe & Fittings Co., Birmingham. Jeptha Howe, of Cincinnati, is a director, as well as several prominent Birmingham citizens.

Stock Market Badly Demoralized

During the greater part of last week stock market conditions in New York bordered on demoralization. Prices fell from 10 to 15 points on many issues and something like 100 issues made new low records for the year. This condition was attributed to alarming crop reports and to the reduction in freight rates ordered by the interstate commerce commission. The market rallied somewhat Friday.

Monday the market was weak and lower on reports of crop damage. Tuesday was active with prices falling to low records in numerous issues. Steel common furnished about one fourth of the market. Wheat was active and higher on further reports of the drought in the northwest.

Wednesday there was a million-share market and demoralized conditions. The interstate commerce commission's ruling on freight rates west of the Missouri river almost created a panic. Wheat was a little lower and in the Pittsburg market crucible steel made a new low record. Thursday brought the climax of the downward movement. About 1,500,000 shares were dealt in, but toward the close of the day there was a rally from the extreme low point. The commerce commission's announcement that it would not suspend the new rates to go into effect in eastern territory July 1 had a favorable effect. Friday the market was less active and irregular with prices for active issues somewhat higher. Saturday was a holiday on all exchanges.

Money on call throughout the week was easy and closed at from 3½ to 2½ per cent. Clearings throughout the United States were estimated at $3,337,564,775, against $2,844,383,427 the week before, and $3,033,302,248 the corresponding week of the year before. The actual report of the clearing house banks showed loans increased $9,813,800; deposits decreased $9,995,800; surplus decreased $16,446,550, and the ratio of reserve 25.7 against 27.1 the week before. Trust companies and non-member banks reported loans and investments increased $2,125,500, deposits increased $5,474,200, and the percentage of reserve 17.2 against 17.1 the week before.

Exports of gold for the week as reported by the New York custom house were $400; imports amounted to $118,496. Failures during the week were reported as numbering 222, against 219 the week before, and 250 the corresponding week of the year before. Liabilities in failures reported in June were $11,817,454 against $12,607,122 for June of last year.

Sales of shares on the exchange numbered 4,930,900, against 2,280,350 the week before and 2,224,291 the corresponding week of the year before. Bonds other than government bonds sold to the value of $9,150,000, against $8,570,000 the week before, and $21,688,000 the corresponding week of the year before.

Copper Stocks.

New York.—Amalgamated Copper closed 60⅝, a decrease of 3⅝.

Boston.—Butte Coalition closed 16, a decrease of 3; Calumet & Arizona closed 50, a decrease of 3½; Calumet & Hecla closed 535, a decrease of 8; North Butte closed 19¾, a decrease of 6⅞; Quincy closed 13, a decrease of 1⅛.

Financial Notes.

The New York Air Brake Co. has declared a quarterly dividend of 1½ per cent, payable July 11.

The Pittsburg Coal Co. has declared the usual quarterly dividend of 1¼ per cent on preferred stock, payable July 25.

The Vulcan Detinning Co. has declared the regular quarterly dividend of 1¼ per cent, and an additional dividend of one-half of 1 per cent on account of accumulated unpaid dividends on the preferred stock, payable July 20.

THE LEADING INDUSTRIAL SECURITIES.

	Closing Quo. July 2	Changes in week	Annual Meeting date 1910	Stock Outstanding	Basis	Dividend: Last Dividend	Dividend: Date Last Div. Pay.
Allis-Chalmers	8½	— ½		$19,820,000		.....	.....
Allis-Chalmers, pr	30¼	—1¾		16,150,000	7 cum.	1¾ Q.	Feb., 1904
American Can	7½	—2	Feb. 2	41,233 300		1¾ Q.	.....
American Can, pr	68½	—3½		41,233,300	7 cum.	1¼ Q.	July, 1910
Am. Car & Fdy	51⅜	—2⅝	June 24	30,000,000		½ Q.	July, 1910
Am. Car & Fdy., pr	139	—5		30,000,000	7 n. c.	1¾ Q.	July, 1910
American Loc	40¼	—1¾	Oct. 18	25,000,000	5	1¼ Q.	Aug., 1908
American Loc., pr	107	— ¾		25,000,000	7 cum.	1¾ Q.	July, 1910
American Ship	80⅜	+ ⅛	Oct. 12	7,600,000	4	1 O.	Mar., 1910
American Ship, pr	111⅛	.....		7,900,000	7 cum.	1¾ Q.	July, 1910
Am. Steel Foundries(new)	51	—4½	Dec. 1	17,184,000		1¾ Q.	.....
Barney & Smith	25	.....	June 7	2,000,000	4	.....	Sept., 1907
Barney & Smith, pr	100	.....		2,500,000	8 cum.	1 Q.	June, 1908
Bethlehem Steel	23	—3	April 5	14,862,000		.....	.....
Bethlehem Steel, pr	53	.....		14,908,000	7 n. c.	¾ Q.	Feb., 1907
Cambria Steel	42	—2¾	Mar. 15	45,000,000	5	1¼ Q.	May, 1910
Cambria Iron	45	+ ½		8,468,030*	4	2 S. A.	Apr., 1910
Chicago Pneumatic Tool	37⅜	—1⅜	Feb. 21	6,145,000	4	1 Q.	Apr., 1910
Colorado Fuel	31⅜	—4⅛	Oct. 17	34,235,500		1¾ Q.	Apr., 1902
Crucible Steel	11⅛	—1½	Oct. 19	24,578,400		3½.	.....
Crucible Steel, pr	78	—3		24,436,000	7 cum.	2⅜ Q. †	June, 1910
Empire Steel	12	.....	Feb. 23	1,254,770		.....	.....
Empire Steel, pr	65	—5		2,500,000	6 cum.	3 S. A.	July, 1910
Fay & Egan	70	.....	Feb. 15	1,000,000	7	3 S. A.	Feb., 1910
Fay & Egan, pr	115	.....		1,000,000	7 cum.	1¾ Q.	Nov., 1909
General Electric	141	—5	May 10	65,179,600	8	2 Q.	July, 1910
Harbison-Walker	33	.....	Jan. 17	18,000,000		½ Q.	June, 1910
Harbison-Walker, pr	94	.....		9,600,000	6 cum.	1½.	Apr., 1910
International Pump	43⅛	—2⅜	May 10	17,762,500		1 Q.	Apr., 1905
International Pump, pr	80	—4		11,350,000	6 cum.	1½ Q.	May, 1910
Lackawanna Steel	40	—5	Mar. 9	34,978,000		.....	.....
Lake Sup. Corp	19	—3	Oct. 5	40,000,000		.....	.....
New York Air Brake	76⅞	+1⅞	June 16	10,000,000	8	2 Q.	Oct., 1907
Niles-Bement-Pond	98	.....	Feb. 2	8,500,000	6	1½ Q.	June, 1910
Niles-Bement-Pond, pr	104	.....		2,000,000	6 cum.	1½ Q.	May, 1910
Otis Elevator Co	45	.....	Mar. 21	10,000,000	3	1½ S. A.	Oct., 1910
Otis Elevator Co., pr	94	.....		6,500,000	6 n. c.	1½ Q.	July, 1910
Pa. Steel	64¾	— ¼	May 9	10,750,000		.....	.....
Pa. Steel, pr	105⅞	.....		16,500,000	7 n. c.	3½ S. A.	May, 1910
Pittsburg Coal Co	16⅝	—2¾	Mar. 8	28,104,600		.....	.....
Pittsburg Coal Co., pr	..	.....		27,071,800	7 cum.	1¼ Q.	Apr., 1910
Pressed Steel Car	32	—4	Feb. 16	12,500,000		1 Q.	Aug., 1904
Pressed Steel Car, pr	95	—1½		12,500,000	7 n. c.	1¾ Q.	May, 1910
Pullman	155	—2½	Nov. 9	120,000,000	8	2 Q.	May, 1910
Railway Stl. Spring	30½	—4⅜	Mar. 3	13,500,000	2	1 S. A.	Oct. 1908
Railway Stl. Spring, pr	101½	.....		13,500,000	7 cum.	1¾ Q.	June, 1910
Rep. Iron & Steel	30⅛	—2⅞	Oct. 19	27,191,000		.....	.....
Rep. Iron & Steel, pr	92	—3		20,416,900	7 cum.	1¾ Q.	July, 1910
Sloss-Sheffield	65	—3½	Mar. 9	10,000,000	5	1¼ Q.	June, 1910
Sloss-Sheffield, pr	117¾	.....		6,700,000	7 n. c.	1¾ Q.	July, 1910
U. S. Pipe & Fdy. Co	16	— ¾	June 22	12,106,300	2	1 Q.	Dec., 1907
U. S. Pipe & Fdy. Co., pr	55	—5		12,106,300	7 n. c.	1¾ Q.	Mar., 1910
U. S. Steel	72⅛	—5½	April 18	508,302,500	5	1¼ Q.	June, 1910
U. S. Steel, pr	115½	— ½		360,281,100	7 cum.	1¾ Q.	Oct., 1909
U. S. Steel 5s	101¾	—1¾		463,798,000	5	.....	Jan., 1910
Va. Iron, Coal & Coke	58	.....	S pt. 20	9,073,680		.....	Mar., 1910
Westinghouse Elec	61	—2	July 27	27,173,200*		1¾ Q.	Mar., 1910
Westinghouse Air Brake	140	.....	Oct. 4	14,000,000*		6 Q. ‡	July, 1910

Par value of shares $100, except those starred (*), $50.
† Includes ⅜ per cent extra.
‡ Includes 1½ extra and 2 special.

THE IRON TRADE REVIEW

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THE AVERAGE PAID CIRCULATION OF THE IRON TRADE REVIEW FOR THE ISSUES OF THE FOLLOWING MONTHS WAS:

January, 1910	5,681
February	5,703
March	5,754
April	5,793
May	5,827
June	5,842

July 7, 1910

SHEET AND TIN MILL LABOR CONDITIONS.

A very peculiar condition exists in the sheet and tin plate industry as to unionism. There are 15 sheet and tin plate producers in the United States which recognize the Amalgamated Association and sign scales annually to govern the rates of wages paid to the workmen at the hot mills. It was a committee representing twelve of these manufacturers, which reached a settlement with the association's wage committee last week, on the basis of continuing the existing scale in every respect. There are no other labor organizations in the field, and the 65 tin and 74 sheet mills operated by the 15 interests, which recognize the union, compare with a total of about 380 tin and 395 sheet mills in the country, so that about one-sixth of the tin and one-fifth of the sheet mills of the country are union. Combining sheet and tin mills, the total of the country is about 775, of which 139, or 18 per cent, are union.

It is not necessary to refer, even briefly, to the incidents of the past 10 or 15 years, which have led up to this state of affairs, for we are interested in the present condition, not the history, of wage relations in this industry. The peculiarity of the condition lies not in the condition of unionism being far from complete, for in some industries there is no unionism at all. What is peculiar is the particular percentage. A percentage of 60, 75, 90 or 100 of unionism, or a condition of complete non-unionism, is not peculiar. A proportion of 18 per cent unionism is very peculiar.

It is not that the unionism is confined to a certain district in the country. The 15 union interests have mills in the following states: Pennsylvania, Maryland, West Virginia, Kentucky, Ohio, Indiana, Illinois and Missouri. These states produce more than 90 per cent of all the sheets and tin plates made in the country.

Obviously it is somewhat undesirable for a manufacturer to sign a wage scale governing rates and conditions for a year when 80 per cent of the competition is non-union. Obviously, also, the condition is not extremely undesirable, or the manufacturer would engage in a contest rather than continue it. The union scale, as to rates and conditions, has approached the status of the strictly open shops so closely that there is very little difference between union and open-shop conditions.

There is, relatively speaking, a scarcity of sheet and tin mill labor, or the events of the past year would have led to a state of complete non-unionism at this time, and the history of employment conditions becomes of moment.

There has been an enormous increase in the demand for this class of labor, which is of importance, since it is not common labor, such as can readily be supplied from other industries or by immigration from central and southern Europe. Twenty years ago, there was no tin plate industry at all in the United States, while there were perhaps less than one-third as many sheet mills as to-day, each sheet mill employing a smaller number of men than at present. The bulk of the labor at that time was English. As the tin plate industry made its rapid strides in the middle nineties, the labor was supplied chiefly by immigration from Wales. Twelve years ago, the great bulk of the labor employed at both sheet and tin mills was labor which had had its training in England and Wales. The proportion of British born labor has greatly decreased in the past 12 years, through Americans taking up the employment.

In several respects, the conditions as to sheet and tin mill labor—it being remembered that we speak all along only of hot mill labor—are noteworthy. The men work eight hours from start to stop, leaving 16 hours of the day free, and in two out of three weeks only five days per week, with six days in the third week. The highest paid men earn in the neighborhood of $2,500 a year, although this is the case with but a relatively small percentage. The majority of the men earn from $1,500 to $2,000 a year, while the poorest paid man, the catcher, who is practically an apprentice, makes from $600 to $1,200 a year, according to continuity of employment and tonnage of the mill. The catcher engages in the work because he expects some day, perhaps soon, to become a roller. Besides the regular jobs, there are frequently helping jobs, the pay of the helpers being moderate, but in keeping with the character of service performed. The conditions of labor, while it lasts, are severe. The temperature is frequently excessive, always so when the thermometer outside is above 70 degrees, the manual labor is steady and hard, and considerable skill and close attention are required. In any industry it is recognized that the combined requirement of skill and manual exertion makes a relatively difficult job.

Earnings per man are larger than they were 10 years or 20 years ago, yet it is a fact that the present Amalgamated Association scales, for both tin mills and sheet mills, are the lowest the association has ever had. Some of the non-union mills pay a considerable percentage below the union scale, while since May 1, certain open shop mills have been paying a slight percentage above the union scale. The increase

in earnings is due to increase in tonnage, requiring, however, increased skill and manual labor almost in proportion.

Hopes of rolling sheets by mechanical means so as to eliminate the hand labor have been almost abandoned, so that the indication is clearer than it was five years, 10 years or 15 years ago that this material will continue to be made by hand labor. The number of mills, and consequently of jobs, promises to increase indefinitely. In the circumstances, and considering the relatively large earnings, it will evidently be advantageous to the manufacturers to improve working conditions as much as possible, so as to attract the best class of labor. Opportunity is afforded for the manufacturers to take this up along several lines. The leading interest has become a pioneer in the introduction of ventilation in such manner as directly to increase the tonnage at the same time that the workmen are made more comfortable. The general introduction of shower baths will no doubt come in due course. The manufacturers are now in position to take the initiative. In its long course of control, now practically ended, the Amalgamated Association never interested itself along these lines. Its sole achievement was a new footnote which it secured in 1903, requiring all union mills to furnish suitable drinking water!

APPEAL ON AN IMPORTANT DECISION.

Recently there appeared in the columns of THE IRON TRADE REVIEW, a report that iron and steel drums containing glycerine were held free of duty by the board of United States general appraisers.

The drums paid 30 per cent under a tariff provision (paragraph 151, tariff act of 1909) which, while broad enough to cover the drums, was also broad enough to cover tin boxes, needle cases, cans for vegetables and many similar articles, provided they were cylindrical or tubular. The tariff provision reads: "cylindrical or tubular tanks or vessels for holding gas, liquids or other material, whether full or empty."

The reason expressed for the decision of the board was that it was not the intent of congress to charge such duty on usual and necessary coverings which are imported merely as incident to the importation of their contents, but only on articles as gas tanks, storage cylinders, etc., designed for purposes other than the bona fide transportation of their contents. The board might have some trouble in the application of its rule, for it does not seem plausible to state that gas tanks are used for purposes other than the bona fide importation of the gas therein. The treasury department at Washington ordered the assistant attorney general at New York to appeal the ruling to the United States Customs Court of Appeals, "as the issue is an important one."

The provision appearing in the present tariff laws for the first time is a very troublesome one, and is causing all sorts of protests. The customs officers in collecting the revenues are also acting inconsistently on account of the provision.

Section 28 (sub-section 18), present tariff laws, as did the customs administrative act, now repealed, requires the value of usual coverings of merchandise paying ad valorem duty to be added to that of the merchandise and that the appropriate duty be taken on the total amount.

When the ad valorem rate of duty on the contents is less than 30 per cent, the collectors take that duty on the coverings, by reason of paragraph 151 repeated above. But when the duty on the contents is greater, then he exacts the duty by reason of the provisions of section 28. Then the importers, generally, are claiming that, where the contents pay greater than 30 per cent duty, the containers therefor are dutiable at that rate.

The board recently decided that the administrative sections operate over the entire tariff laws, and take precedence over all of the paragraphs, regardless of how explicit they may be. If this ruling is upheld, the coverings of ad valorem duty goods will not be dutiable under paragraph 151, whether or not 30 per cent is greater or less duty than otherwise.

If the board's decision that coverings for specific duty goods, such as these, are free, is reversed, then they will have to pay 30 per cent duty regardless of whether their contents are dutiable or free.

If the decision is affirmed, then the paragraph will hardly apply to anything.

In the meantime, the lawyers are busy spelling out which rulings they will find most profitable, expecting to act accordingly.

CAR & FOUNDRY CO.

Gives Out Annual Report—Business Was Satisfactory.

The annual report of the American Car & Foundry Co. for the year ending April 30, 1910, has just been issued. The income account compares as follows:

	1910.	1909.	1908.
Net earn....	$ 5,725,098	$ 3,741,975	$10,624,574
Renewals, etc.	1,635,620	846,144	2,409,956
Bal. avail. for div...	2,100,000	2,100,000	2,100,000
Balance ..	*$1,989,478	$ 795,831	$ 6,114,618
Com. div....	600 000	600,000	1,050,000
Surplus ..	$ 1,389,478	$ 195,831	$ 5,064,618
Main and imp.	.....	.....	1,650,000
Res. com. div..	.....	.....	603,000
Surplus ...	$ 1,389,478	$ 195.831	$ 2,814,618
Prev. surp..	22,563,078	22,367,247	19,552,630
P. & L. surp.	$23,952,566	$22,563,078	$22,367,243

*Equal to 6.63 per cent on $30,000,000 common stock as against 2.65 per cent earned on same stock last year.

President Eaton states that though the year's business showed a marked increase over that of the year before, still the increase was not well distributed, as the pendency of federal legislation affecting railroads caused a marked falling off in the last half. Orders on hand April 30 were considerably greater than on the corresponding days of the two preceding years. From the reserve for construction and addition to steel car plants there was expended during the year $676,134, and from the fund for general overhauling improvements, etc., $538,414. The plans for a new steel car plant, which were announced as ready a year ago, have not been carried out for the reason, as stated by the president, that it was thought more economical to increase the capacity of existing plants. Business throughout the year is stated to have been on a highly competitive basis with the result that the margin of profit was small, notwithstanding which President Eaton declares that the management feels the year's operations to have been satisfactory.

COKE DECISION

Reversed by Court of Appeals, But the End is Not Yet.

According to word received in Buffalo, the United States court of appeals has reversed the decision of Judge Hazel, who granted the local steel companies an injunction restraining the railroads from putting into effect the proposed advance on rates on coke from the Connellsville district to the Buffalo district. The new order provides, however, that the decision shall not go into effect until July 15, pending an appeal to the United States supreme court. Attorneys for the steel companies said this morning that an appeal will be made at once to a justice of the United States circuit court, asking for reinstatement of the order originally granted.

NORWALK PLANT SOLD.

The Huron Steel & Iron Co., Norwalk, O., was sold at public auction Saturday by a federal court special master, for $190,000. The property had been appraised at $129,364.96. Two bidders appeared; one, S. A. Ingersoll, president of the Galesburg Coulter Disk Co., of Galesburg, Ill., which has been operating the plant for five months under lease; the other and successful bidder being the Assets Realization Co., of Camden, N. J. The representative of the latter company is quoted as saying that the works will be operated by a concern of large financial means.

BAND MILL AT SHARON.

The Sharon Steel Hoop Co., Sharon, Pa., has ordered plans prepared for a mill for rolling bands and will let the contract for the mill's erection and equipment as soon as the plans and specifications are completed. It is estimated that the proposed mill will cost $150,000.

OBITUARY.

Jacob Adler, president of the American Scrap Iron Co. and The Akron Brass & Bronze Co., Akron, O., committed suicide June 27, aged 32. Business difficulties are assigned as reasons for the act.

James Laughlin Michels, aged 78, a well-known labor leader, is dead at the family residence, West End, Pittsburg. For over a quarter of a century he was prominently identified with national labor movements. In 1862, Mr. Michels was prominent in the organization of the Sons of Vulcan. It was from this organization that the present Amalgamated Association of Iron, Steel & Tin Workers resulted.

Julius Bieler, aged 59, president of the Third National Bank, Pittsburg, and former treasurer of the Crucible Steel Co. of America, died at his home in Pittsburg, June 29. Mr. Bieler was born in Germany, March 24, 1851. Thirty-eight years ago, he went to work for Miller, Barr & Parkham, iron manufacturers, the firm later being merged into the Crescent Steel Works, Pittsburg. It was later consolidated with other steel plants and became part of the Crucible Steel Co. of America. Mr. Bieler was treasurer of the company for many years, resigning about 18 months ago.

PERSONAL.

Humphrey D. Bond, of Vivian-Bond & Co., New York City, pig iron and metals, has gone to Europe on a four or five weeks' trip.

H. Kilburn Scott, M. E., 46 Queen Victoria street, London, E. C., has sailed for British East Africa on professional business.

Charles J. Colbert Jr., who was formerly connected with the Consolidated Connellsville Coke Co., Uniontown, Pa., has taken a position in the sales department of the Washington Coal & Coke Co., at Pittsburg, Pa., succeeding T. M. Hyndman, resigned.

Frazier & Fox, consulting engineers, announce that their partnership has been dissolved, Mr. Fox retiring to accept the position of chief engineer for the Pittsburg Plate Glass Co. The business will be assumed by Mr. Frazier, who will continue the engineering work under the name of the J. W. Frazier Co., engineer, with offices in the Rockefeller building, Cleveland.

WILL BUILD STEEL DREDGE.

The Ellicott Machine Co. has given the Maryland Steel Co. a contract to build a large suction dredge. The steel company is to build the hull and boilers alone and the machine company is to finish the dredge, which will be entirely of steel. It will be 150 feet long, 40 feet wide and will have a depth of hold of 10 feet 6 inches.

The Ellicott Machine Co. has lately secured a contract for dredging in the canal zone. The tug Tormentor has just towed one dredge to Colon for the local company.

NEW FURNACE

Being Built by Virginia Pig Iron Maker—Use Local Ores.

A new modern blast furnace is under construction at Low Moor, Va., by the Low Moor Iron Co. This stack will be of the latest design and will be equipped with a modern skip hoist, new blowing engine and other improvements. It will have an annual capacity of about 60,000 tons, operating upon local ores and its product will be foundry iron. The first cast is expected to be run before the latter part of the present year. The new furnace will be the No. 2 stack at Low Moor, as the company now operates alternate stacks at this point. In addition, it controls the Covington furnace at Covington, Va.

STOVE CONCERN WILL ERECT TWO BUILDINGS.

The Baxter Stove Co., Mansfield, O., is having plans prepared by Vernon Redding, architect, for some new buildings. Increasing business has made it necessary that the company purchase 37,000 square feet of additional land, immediately adjoining its present site. It will erect two new buildings of mill construction, one 54 x 200 feet, two stories, and the other 50 x 180 feet, two stories, with a connecting building in front. Gas engines will be installed to furnish power. In addition to purchasing land from the New Method Co., the Baxter Co. has also purchased the New Method Co.'s japanning building. Practically all of the machinery needed in the new plant was purchased immediately after its fire of Feb. 18, when it was fortunately able to secure space for its mounting and assembling departments with another nearby factory. Since the foundry was not damaged by the fire, it was enabled to begin turning out stoves in about two weeks. The plans for the proposed buildings will be finished this week, and bids will be received next week.

WILL INCREASE DEBT.

The stockholders of the Phoenix Iron Co., Philadelphia, with works at Phoenixville, Pa., have voted to increase the company's indebtedness from $930,000 to $1,500,000 to retire an issue of bonds due Sept. 1, 1910, and bearing 6 per cent interest, in order to enlarge the company's working capital and to make desired extensions. The new issue will run a term of 20 years.

THE RECONSTRUCTED EARLSTON FURNACE

A Design Embodying Special Features to Meet Unusual Conditions in Ore and Fuel.

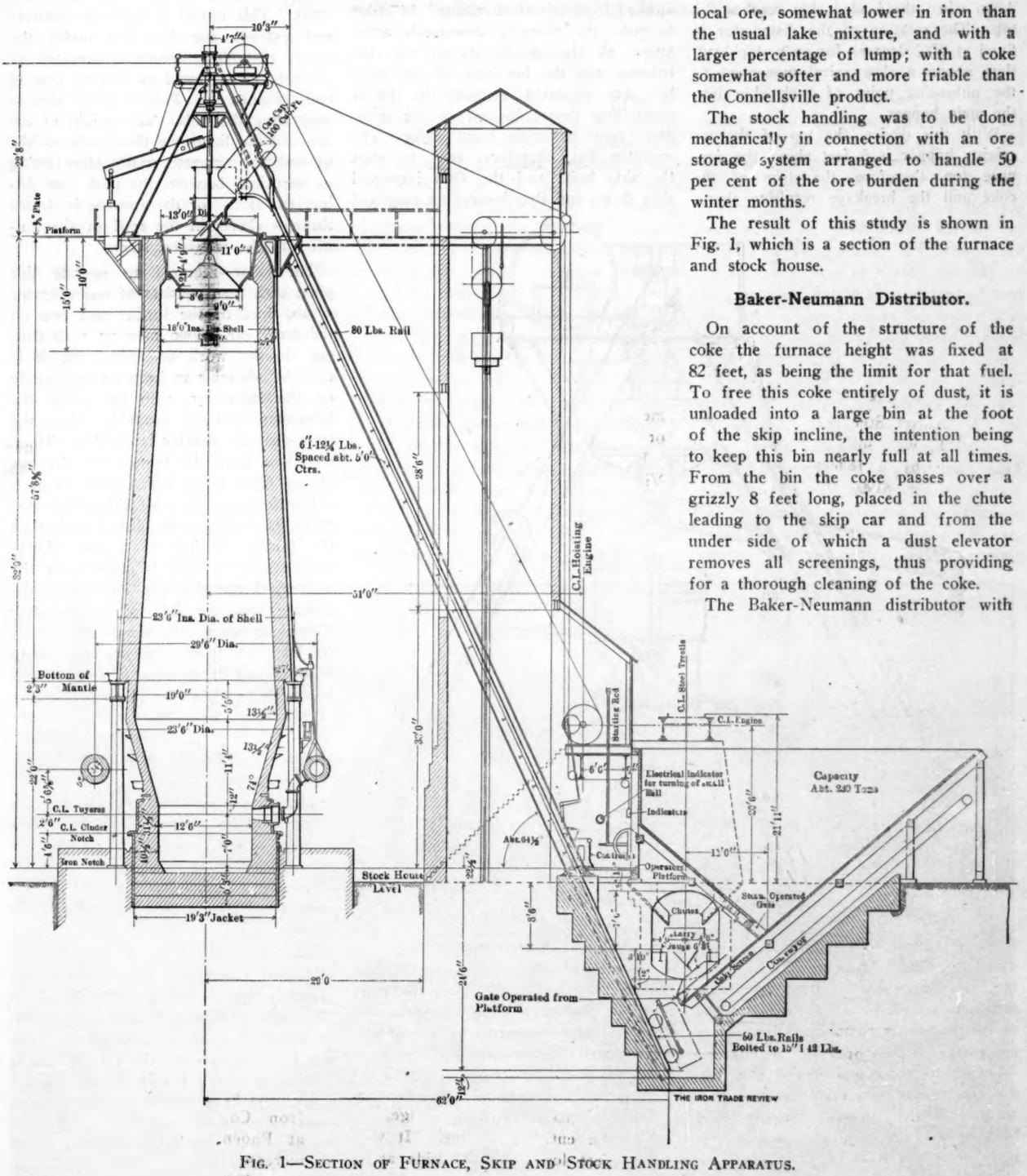


FIG. 1—SECTION OF FURNACE, SKIP AND STOCK HANDLING APPARATUS.

Some interesting details of construction of the new Earlston furnace, the starting of which was recently noted, are presented herewith:

This furnace, owned by Joseph E. Thropp, replaces the stack frequently referred to as the Everett furnace, and is located at Everett, Pa.

The problem of reconstruction included the erection of a modern stack of 250 tons daily capacity adapted for the smelting of a large percentage of local ore, somewhat lower in iron than the usual lake mixture, and with a larger percentage of lump; with a coke somewhat softer and more friable than the Connellsville product.

The stock handling was to be done mechanically in connection with an ore storage system arranged to handle 50 per cent of the ore burden during the winter months.

The result of this study is shown in Fig. 1, which is a section of the furnace and stock house.

Baker-Neumann Distributor.

On account of the structure of the coke the furnace height was fixed at 82 feet, as being the limit for that fuel. To free this coke entirely of dust, it is unloaded into a large bin at the foot of the skip incline, the intention being to keep this bin nearly full at all times. From the bin the coke passes over a grizzly 8 feet long, placed in the chute leading to the skip car and from the under side of which a dust elevator removes all screenings, thus providing for a thorough cleaning of the coke.

The Baker-Neumann distributor with the structural work at the top, is shown on a large scale in Fig. 2. The distribution of each skip load is accomplished by a distributing plate attached to the gas seal. The gas seal bell is closed by a steam cylinder as the skip

car leaves the top and, while the piston on this cylinder is moving upward, supported on a cushion of steam, a spirally threaded tail rod attached to the piston gives the required rotation to the bell.

In opening the gas seal, the bell makes no rotative movement and it is always down when the loaded skip reaches the top. The rotation of the distributor is fixed at 87½ degrees for each skip load, thus giving a slow spiral movement to the unloading point of each skip into the main hopper.

With this device, the top of the receiving hopper is 5 feet above the furnace top, therefore, the drop of the coke and the breakage resulting therefrom is reduced to a minimum. In addition to reduced breakage in coke handling, this distributor is said to give very satisfactory results where the problem of distribution is complicated by a large percentage of lump ore in the mixture.

Owing to the simplicity of this top, the repairs are very light and, in fact, several of the turning cylinders have been in use for two years without repairs being necessary.

In the design of the top, reducing the time and cost of making renewals has been kept in view. The double bell rods are provided with holes every 2 feet and the steam cylinder for closing the main bell is designed to lift the gas seal, the lip ring and the old bell, when one after another of these castings must be raised to introduce a new bell.

The lip ring is securely held in place by six 3 x 3-inch square holding-down bars extending up through the gas seal and securely keyed into bosses extending upward from this steel casting. In order to make the charging thoroughly automatic, all the movements of the distributor and the lowering of the main bell are operated mechanically by a controlling device located in the operator's room under the hoist engine. The operator has, therefore, only to start the skip hoist and the Otis improved slow down and stop insures an easy and accurate stop of the skip at each end of the incline without hand control. The skip is filled with coke from the main coke bin, the gates being operated by a steam cylinder controlled by a four-way valve placed conveniently for the operator.

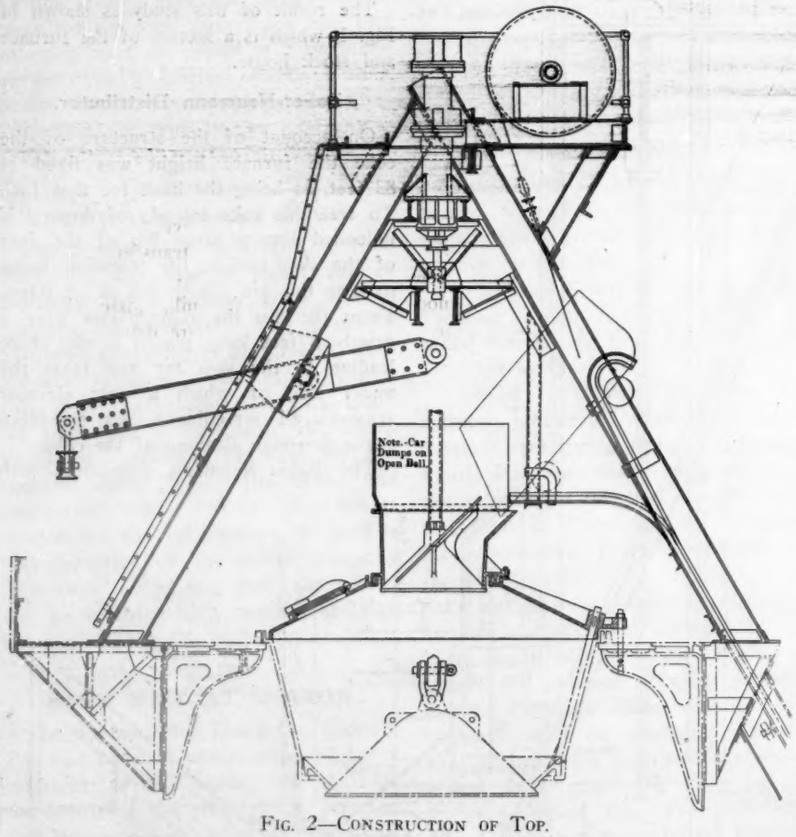


FIG. 2—CONSTRUCTION OF TOP.

Tunnel System.

Indicators are provided which show the movement of the main bell and the distributor and the level of the stock in the furnace at two diametrically opposite points can be ascertained by two stock indicators showing on a dial the stock level.

In the construction of the skip incline the old brick hoist was allowed to remain and was utilized as a counterweight tower and stairway to the furnace platform.

The skip car is served by an electric weighing larry, operated in a tunnel under the stock piles of ore and limestone. This tunnel is built of concrete and extends for 340 feet under the center of a high trestle constructed of concrete piers placed at 30-foot centers and spanned by 36-inch steel girders supporting the rails. The weight of the ore and the limestone thus rests on the ground, the concrete trestle piers acting as partitions between the piles. In filling, the stock for the furnace is drawn through chutes in the roof of the tunnel into the weighing larry.

The labor required to operate this plant each turn consists of one operator at the foot of the incline and two on the larry car. Two men on each turn can do the work of filling, but it is thought advisable to keep an understudy on the larry car, who can assist the larry-man and be available when the larry-man or operator is off duty. These men also keep the tunnel and skip pit clean. This latter task, which is such a laborious one at most skip filled furnaces, is readily accomplished each time the furnace is full, by a very simple contrivance. A door is placed near the bottom of the skip car into which the spillage into the skip pit is shoveled. This door has a very simple and effective latch which prevents opening during hoisting and its location is such that it is not injured by the regular charging of the skip car.

The Furnace.

The stack is provided with a 13½-inch lining for the bosh and, up to 5 feet 5 inches above same, is protected by a steel jacket cooled by a water spray. The only internal cooling plates used consist of one row just above the tuyeres.

The crucible of the furnace is enclosed in a cast steel tuyere and hearth jacket externally cooled. The inwall is 27 inches thick with 2½-inch packing next to the shell which is designed for cooling by water sprays, the run-off falling into a collecting trough at the mantel.

Uniform temperature of blast during each blow of the stoves is secured by the use of a regenerative chamber placed in the hot blast main. This regenerator or equalizer consists of a cylinder 12 feet 6 inches diameter, 20 feet high, filled with fire brick checker work.

The improvements described were carried out from designs furnished by Ladd & Baker, Inc., 1011 Chestnut street, Philadelphia, Pa.

THE HANYANG IRON AND STEEL WORKS AT HANYANG, PROVINCE OF HUPE, CHINA

The Only Steel Plant in the Celestial Kingdom and Which is Now Shipping Iron to the United States.

By A. J. Seltzer.*

The Hanyang iron and steel works is the only one in the whole of China which is producing steel. No better illustration of the conservatism of the Chinese people need be cited than the above statement, for it is well known to all who have traveled at all extensively in this ancient empire that there are huge deposits of excellent iron ore in almost every province. A little over twenty years ago one of the Shanghai viceroys decided to erect an iron works, but just at that time he was transferred to Hupe so the works was built in Hanyang instead of Shanghai. This placed it somewhat nearer the base of supplies, but it is now far removed from all of the raw materials.

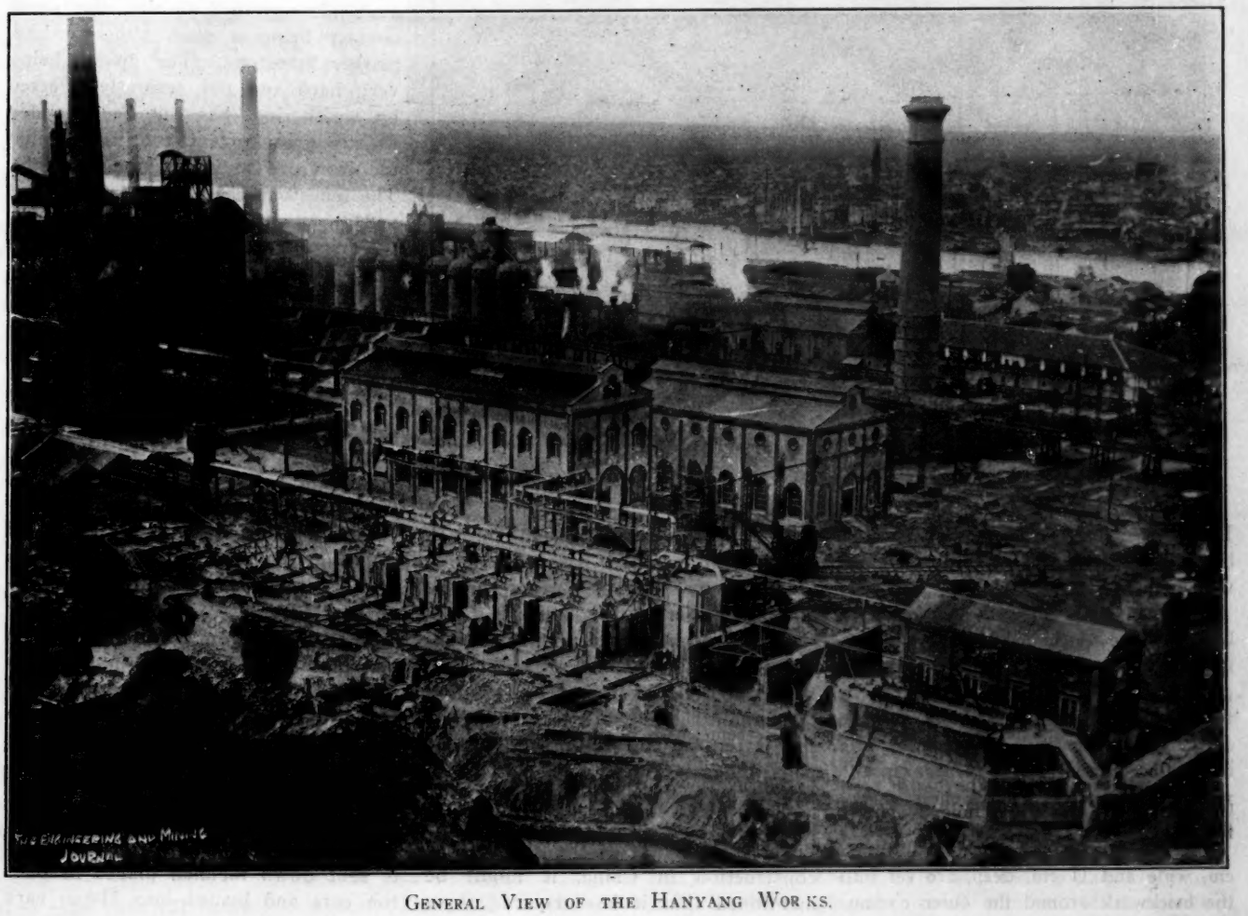
During the first few years of its existence this plant made pig iron only, but in 1893 it began to make steel. Two small Bessemer converters were installed, but owing to high phosphorus and other difficulties the government was unable to place the works on a paying basis, so it was abandoned in 1894 and fell into the hands of wealthy Chinese. The new owners engaged Belgian and French engineers who remodeled the two 60-ton blast furnaces, doubling their capacity, installed three 30-ton Siemens-Martin open-hearth furnaces, put in a rail mill, erected a blooming mill and built a foundry. Thus remodeled and enlarged the works began to turn out excellent rails.

Present Plant and Equipment.

At the present time the plant consists of the two original but remodeled blast furnaces, four 30-ton Siemens-Martin open-hearth furnaces, one Wellman pig mixer, a 100-cm. reversing blooming mill, an 80-cm. reversing plate mill and a 10-ton furnace for melting scrap. The Siemens furnaces are fed with cold scrap part of the time, but for the most part they receive the molten pig from the Wellman mixer, the duplex process being used and the pig washed in an open-hearth furnace to free it of phosphorus. To increase the capacity and also to lower the cost of steel making it has been suggested that the combination process be used; that is, to take the molten pig from the pig mixer, transfer it to Bessemer converters for upwards of 40 minutes to eliminate practically everything but the phosphorus, then transfer it to the open-hearth furnaces.

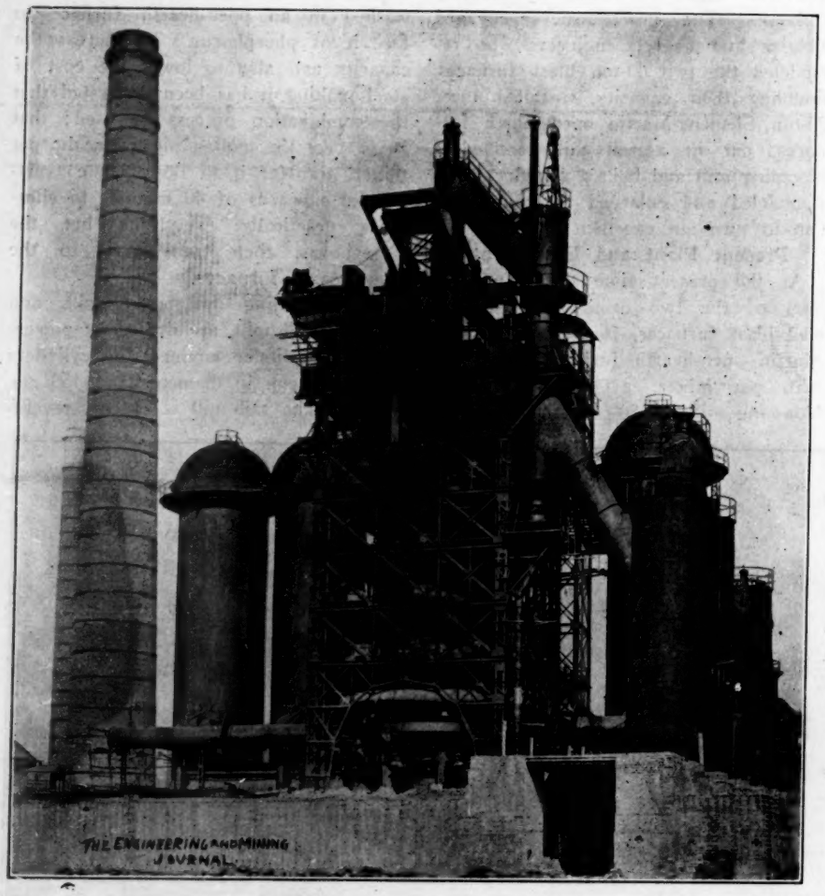
The blooming mill, plate mill, and also the rail mill, are driven by powerful three-cylinder engines, the cylinders being 115 cm. in diameter and 150 cm. stroke. The rail mill is 75 cm., revers-

*Imperial Mining College, Wuchang, China.



General View of the Hanyang Works.

ing, and there is also an 85-cm. beam mill. These mills are all modern German types and are equipped with electric cranes. The large mills have gas-heated Morgan continuous furnaces. The blooming mill has soaking pits for heating the ingots. The ingots are brought hot from the steel furnaces on the cars on which they are cast. All the steel is top cast, two ingots at once, the ladles having two stoppers. The ladles are handled by a 50-ton crane. The present rail mill has a capacity of 250 tons per day, rolling two rails from a bloom, and 85-pound rails are made.



THE NEW GERMAN BLAST FURNACE AT HANYANG.

It has been suggested that the rail mill be remodeled to roll rails direct from the ingot.

The company is just completing a blast furnace of the latest German type. It is 32 m. high, diameter of the crucible is 3.15 m. and there are 16 tuyeres, eight to be used at a time and eight to be held in reserve. The interesting part of this furnace is the water-jacketing scheme, which is shown in an accompanying illustration.

Small cast iron pans, 45 cm. long, 42 cm. wide and 11 cm. deep, are set into the brickwork around the outer circumference and flush with it, giving the outer circumferencce almost the appearance of a network of these pans from the tuyeres to within 3 m. of the top of the furnace. These pans are placed in horizontal rows around the circumference. The rows are 75 cm. apart and the horizontal distance between pans is 100 cm. The pans are so arranged that each pan in a row is not directly underneath one in the row next higher, but the space is so divided as to expose as little of the brickwork as possible. The interior end of each pan is closed, but the outside end has an open space or slit across the top, and through this a 3-cm. iron pipe passes to supply the cooling water. Another similar pipe leads out of the bottom of the pan at the other side and delivers the water to the next lower pan. Thus the water is kept in circulation throughout the network of pans. When the water has traveled through four pans it has become hot enough to go to the troughs which surround the furnace.

To give an idea of the slowness of construction in China, it might be mentioned that it has required three years to construct this furnace. This furnace represents the latest German patents and it will be interesting to see how these new ideas work out in practice. The foundation is already completed for another furnace precisely like this one and it is evident that the company intends to increase the output several hundred per cent. This new furnace will probably be blown in about Feb. 15. The walls are constructed of large firebrick and are strapped with strong bands, 2½ cm. thick and 12 cm. wide. It will be fed by hand buggies, as labor here is so cheap and plentiful that mechanical devices are scarcely considered.

The company has its own iron and coal mines. The iron mines are situated at Tayeh, 145 km. down the Yangtse Kiang from Hanyang and 26 km. back from the river. Here there is really a mountain range of iron ore, the main ore body appearing in three hills, each 250 m. high. Two of the hills are quite near each other, being separated by a narrow valley; the third is at a distance of 6 km. and the vein is barren between.

Character of the Ore.

This is a contact deposit, the contact on the north wall being a compact, close-grained diorite, the south contact being a pure, almost white, marbly limestone. The diorite being very hard and not seriously affected by weathering, has not been eroded to any great extent and lies against the iron ore to its maximum height. The limestone has been greatly eroded and in many places has left the hematite near the surface. The richest part of the range has a southeast-northwest trend, but just beyond this rich part the vein is almost barren and runs practically due east and west.

The ore is a good, hard hematite and it is necessary to blast most of it. The drilling is all done by hand and a poor driller is Mr. Chinaman. He is not only disgustingly slow, but it is practically impossible to convince him that the Western method of pointing holes is far superior to his ideas on the matter, and even after the holes have been marked for him he will often ignore the marks and place the holes according to his own views. The German engineer in charge of the mines informed me that one German driller would break as much ground as eight to ten Chinese.

The work in these iron hills is all open-cut, and as the ore is blasted it is sent down inclined planes in one-ton cars and loaded into 11-ton cars from an ordinary coal-tipping system,

drawn to the river in trains of 12 cars and there loaded into the company's lighters and towed up to Hanyang by the company's steam launches. Each lighter holds 350 tons, and one launch tows two lighters. Practically no prospecting or exploitation has been done upon this wonderful deposit, so in reality but little is known of its contents below the ground level, or its continuity beyond these three rich hills.

At the present time the Hanyang works is being supplied with 350,000 metric tons annually; next year this must be increased to 500,000; and 125,000 tons goes to Japan each year. The present output from the three hills is about 1,000 metric tons per day, but will soon be increased to 1,600 tons. At the present output, the ore in sight will last 70 years, but there is every reason to believe that the vein not only increases in richness with depth but also grows wider.

The Cost of Labor.

The company's coal mines and coke ovens are situated at Pinghsiang, which is about 300 km. up the Yangste Kiang from Hanyang and 175 km. south of the river. Here are the second largest coal mines which are being operated in China. There are 280 coke ovens, and besides supplying coal and coke for the Hanyang works, these mines supply both coal and coke for a large number of steamers, foundries, etc. The Hanyang plant receives at present 160,000 tons of coal and 110,000 tons of coke per year from these mines, and this amount is soon to be materially increased.

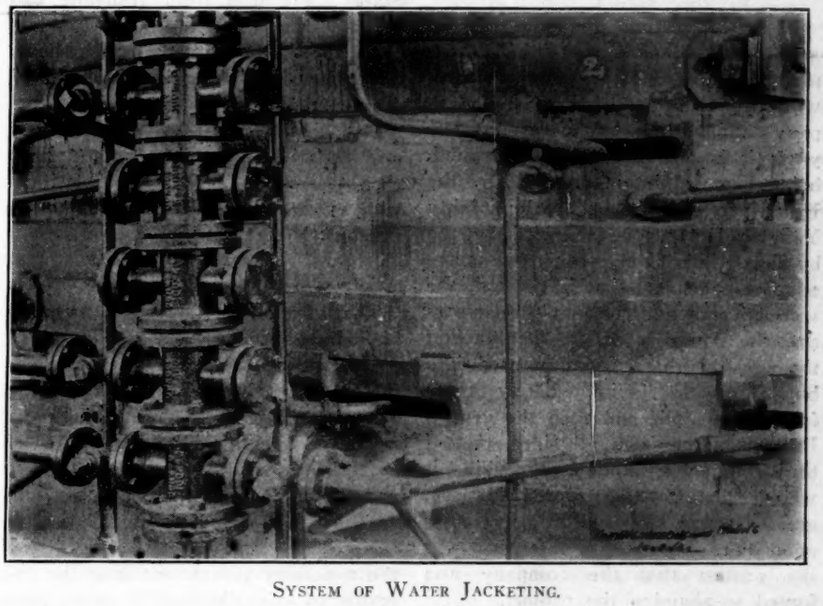
About 15,000 men are employed at the iron mines, steel works and collieries. The following is the schedule of wages at the coal and iron mines per day of ten hours: Miners, 250 to 300 cash (8 to 9.5c); loaders and pushers, 100 to 150 cash (3.25 to 5c); tippling coolies, 100 to 125 cash (3.25 to 3.75c); small boys and old men who carry the ore in wicker baskets, 80 to 120 cash (2.65 to 3.65c). The cost of mining one ton of ore is 270 cash, or 9c, and stripping cost per ton of ore is 30 cash, or 1c gold.

The scale of wages at the steel works is a little higher and is about as follows: Rollers on mills, 350 to 700 cash (10.5 to 21c); heaters on furnaces and open-hearth steel melters, 550 cash (29c); helpers on furnaces, 350 to 500 cash (10.5 to 27c); first helpers, 350 cash (10.5c); blacksmiths, 700 to 1,000 cash (21 to 34c); common labor, about 7.5c gold per day, and boys and women about 5c. The men at the steel works work fairly well, but the miners are shiftless, resembling the Mexican in that they will work just enough days per month to provide sustenance, but no more. They work on an average of 21 days per month.

Products at Hanyang.

	Foundry pig iron per cent	Basic pig iron per cent	Open-hearth steel per cent	Finished steel per cent
C	3.8	3.9	3.34	0.40
Si	2.5	0.65	.....	0.085
Mn	1.0	1.10	0.26	0.089
S	0.01	0.045	0.24	0.055
P	0.02	0.25	0.045	0.028

The following analyses are of the ores at Tayeh, the coal and coke at Pinghsiang and the products at Hanyang:



SYSTEM OF WATER JACKETING.

Analyses of Tayeh Ores.

	Hematite per cent	Brown iron ore per cent	Magnetite per cent
Fe	62	48	65
Mn	0.3	7.0	0.13
SiO_2	4.0	6.0	3.0
Al_2O_3	2.0	....	....
S	0.02	0.01	0.06
P	0.05	0.03	0.12

The Tayeh limestone is of good quality, containing 96 per cent $CaCo_3$. The Pinghsiang coal contains: Ash, 10 to 25 per cent; volatile matter, 25 to 35; sulphur, 0.2 to 0.6 per cent. The coke contains: Ash, 10 to 25 per cent; sulphur, 0.3 to 0.6; phosphorus, 0.06 to 0.25 per cent.

The analysis of blast furnace slag is as follows: SiO_2, 33 per cent; Al_2O_3, 16; CaO, 46; MgO, 2; Fe, 1; Mn, 0.60 per cent.

The steel made by this plant is of an excellent quality in every respect. The rails for the Peking & Hankow railroad were furnished by this company and it is now making rails for the Canton & Hankow railway and the new road that is being built to Chang Sha. The following two tests are among the most severe to which the rails are subjected: An 85-pound rail, 3 feet 6 inches between supports, stood a weight of 40 tons for five minutes, with a permanent deflection of 3/16 inch; a drop test of one blow with a 2,200-pound weight, falling 25 feet caused a 2.5-inch deflection.

Accidents Comparatively Rare.

His Excellency V. K. Lee, a versatile Chinese, is the general manager, and all the other responsible positions and heads are filled by German engineers and metallurgists. The lesser foremen are Chinese and they are exceedingly proud of their positions. The thing which impresses one most on entering the plant is the almost innumerable heaps of scrap, old brick and mortar, junk of all descriptions, that are piled about in almost every part of the works. No general junk yard is set apart, but the whole plant from end to end is littered up with junk. This is, of course, in strict keeping with the Chinese mode of living.

Over 5,000 Chinese are on the payroll at this plant; they swarm about each operation as thick as bees about a honey-suckle, and it is next to impossible for one to understand why they are not burned, scalded, crushed and killed by the score. Taking into consideration the fact that the Chinese are a playful and usually careless people, the small number of accidents which occur is almost marvelous. Of

late years the company has been installing electric motors, hoists, etc., and a great deal more of the work is being done by machinery. However, because of the abundance and cheapness of Chinese labor, hand labor is resorted to wherever practicable. One sees all the coke being loaded and carried about in bamboo baskets on the shoulders of the coolies and the blooms and ingots being pulled about with tongs by the coolies; all handling of the rails is done by hand. These men become expert in the handling of steel and pig iron, and as blacksmiths and foundrymen they are also efficient.

Instances of Chinese Superstition.

Many interesting incidents of the gross superstition of the Chinese people might be related in connection with this plant. Owing to the company's rapid expansion in the last few years it is now cramped for ground, being hemmed in on one side by the Han river, on another by the mighty Yangtse Kiang, on the third by the by Turtle hill. There is only one method of escape, and that is through the sacred Turtle hill. About three years ago the company proposed tunneling through this barren and unused hill, but a great cry immediately arose from the people, and even the gentry. Protests came from all sides, that if the company tunneled the hill it would disturb the sacred dragon, greatly anger him and bring disaster upon the people. So extensive was the protest that the company was forced to abandon the project.

The company then began to fill in a small marshy pond, which was near the base of the hill—again a wild protest, this time that the dragon washed his feet in this pond and that his bathtub should by no means be disturbed. Through strenuous efforts the company persuaded the people that it wished only a small part of the pond filled and would leave a wholesome bathtub for the honorable Mr. Dragon. As it is essential that the company secure more ground, and this Turtle hill is the only possible way of acquiring it, it is now endeavoring to convince the Chinese that it will neither bring disaster and destruction on the people nor anger the dragon.

It is interesting to note that several large shipments of pig iron have gone to New York from the Hanyang works. In November a shipment of 50,000 tons left for New York, and about six months earlier another large shipment went to the United States. Pig iron from Hanyang can be laid down in New York for less than the price quoted in Pittsburg. The Hanyang plant is a wonderful development for China and it is earnestly hoped that it will mark a new era for this conservative people. For the illustrations and description herewith we are indebted to *The Engineering and Mining Journal.*

PLANER ELEVATING DEVICE.

The Cincinnati Planer Co., Cincinnati, have brought out an improved power elevating device as shown by the two accompaning half tones. Fig. 1 is a front view showing the arrangement of gears, the direct drive of gears being used for lowering the rail, and the compound gears, which would also give a reverse motion, are used to raise the rail, the compounding giving the necessary power, enabling the operator to raise the rail at slow speed and lower it at almost double speed. The stand is bored out and fitted with bushings in such a manner that the upper shaft which carries the pulley can be withdrawn with the bushings intact and inserted from the opposite side, so that when making various styles of drives the pulley can be used on either side. As the power elevating device is used but very little it has been designed so that the pulley and upper shaft are the only parts revolving, all of the gears being idle, when not in use. This device is very powerful and at the same time very sensitive and is operated by two small clutches on the top shaft. By having a bearing on each side of the main driving gears all danger of springing the shaft is eliminated.

Fig. 2 is a rear view and shows how simple the device is. On the extreme right is shown the handle for manipulating the clutches and also the small handle for locking it in a central position, guarding against its being thrown in by accident.

PULLMAN CO. BUILDING ON PACIFIC COAST.

Work on the Pullman car shops at Richmond, across the bay from San Francisco, is progressing rapidly. The foundation of the administration building is completed and that of the main factory is almost finished. White pressed brick is being used on the outer walls, giving the buildings a fine appearance. The office building is 70 x 202 feet, three stories. The factory building is 202 x 400 feet, one story, 24 feet in the clear. Two more buildings are to be erected in the rear of the factory building, and other structures, steel frame and concrete, are already laid out to be built as soon as possible.

CANADA CAR PRODUCTION.

President Curry, of the Canada Car Co., is quoted as stating that the output of cars in Canada this year will exceed that of any like period by 50 per cent. So far this year the Canada company has delivered 4,000 cars and will produce 12,000 before the end of the present year.

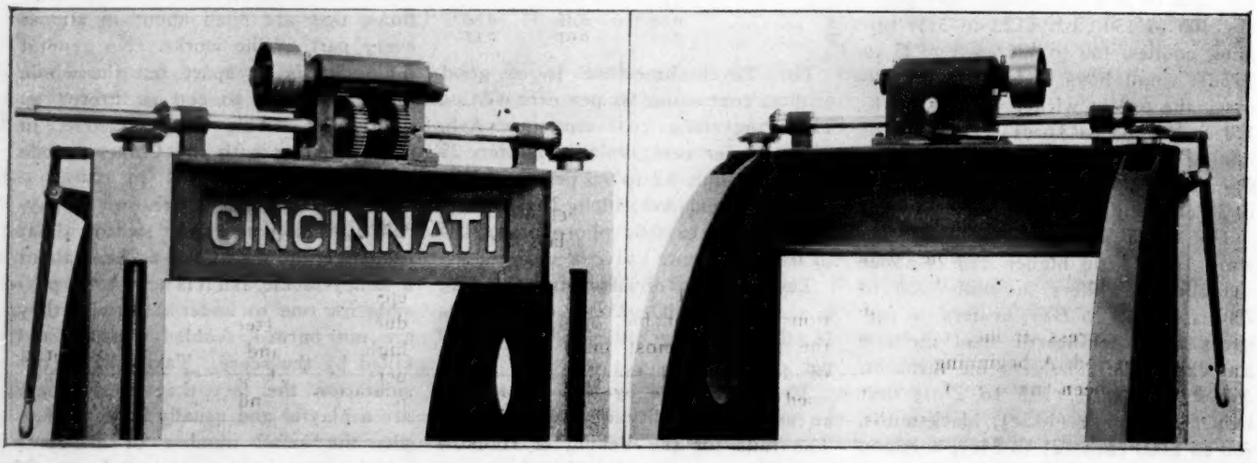


FIG. 1—CINCINNATI PLANER ELEVATING DEVICE.

THE PLACE OF THE ELECTRIC FURNACE IN THE IRON AND STEEL INDUSTRY*

How the Electric Production of Steel Will Become a Commercial Factor.

By Gerald Hooghwinkel.

The writer proposes in the following remarks to give an idea of the results obtained with various types of electric furnaces both for smelting and refining work. This seems the more desirable as considerable progress is being made in other countries, although the conditions are perhaps better here than anywhere else. England, and especially Sheffield, are always described, and with ample reason, as the home of the special steels—the most modern development of the steel industry. The use of, and the demand for, these special steels is increasing every day, and it is not rash to predict that in the near future most of the steel produced will be special steel containing one or several of the rarer metals. Steels will be made to chemical and physical specifications, varying in each case and for each special purpose, among which may be mentioned high-speed tool steel, steel for motor cars and perhaps aeroplanes, steel for special castings, for boiler plates, for railway trucks, for special track work, for bridge girders and for rails.

Nearly all these steels have been manufactured in the electric furnace in various countries, and in the near future no steel works will be complete without one or more electric furnaces to supply the ever-growing demand for special steels at reasonable prices, and especially to definite and stringent specifications, and of exactly the same composition for repeat orders. The last-named condition is of great importance where special steels are concerned, and is at present exceedingly difficult to obtain, even where high prices are being paid.

The Improvement of Rail Steel.

By far the greatest demand, however, will arise when once the various railway authorities have settled upon a new rail for main lines, the present rails being entirely unsuitable both chemically and physically to stand the great strains to which they are submitted, by express traffic, during a reasonable period. A beginning in this direction has been made in Germany, where the State railway authorities have issued a specification for electric steel rails, specifying higher figures for the physical tests and resistance to wear than is usual for ordinary basic rails, viz., a tensile strength of 99,000 pounds per square inch against 85,000 pounds per square inch. They also require a guaranteed life of 10 years for the track rails. The actual test figures obtained with both qualities of rails were 119,000 pounds and 97,000 pounds respectively. An electric steel rail, made for the Metropolitan Railway of London, and tested at the Clarence Steel Works of Messrs. Dorman, Long & Co., Ltd., contained carbon 0.78, silicon 0.196, manganese 0.285, sulphur 0.035, phosphorus 0.022. By the Brinell hardness test, with a 19-mm. ball and 50 tons pressure, it gave an impression 3.7 mm. in diameter. With a 2,240-pound drop test falling 25 feet, it gave 3.56 inches deflection; a second fall of 21 feet did not break it, but it broke at the third blow with a 37-foot fall.

Cost of Power a Minor Consideration.

The following results have been obtained from some 80-pound electric steel rails rolled in the United States, carbon content 0.80 per cent, with a 2,000-pound drop, and distance between supports, 4 feet.

No. of drop.	Height of drop.	Total deflection in inches.
1	20	2.5
2	10	3.5
3	10	4.2
4	10	Broken

The same may be said of steel castings produced in the electric furnace. It has been found that the chemical and physical qualities of such castings are far superior to those produced in crucibles on account of the facility and safety with which any specified quality can be produced. In short the electric furnace will be found a necessity in all large steel works for the production of high-class uniform steel for different purposes in large quantities and to various specifications at reasonable prices. This is the first and most important source of demand, and the furnace will be used more often as a refining furnace, working on hot charges direct from the converter or mixer, or from a Thomas-Martin or Bessemer furnace, or on cold scrap and pig iron. As will be shown farther on, for certain classes of steel such as fine tool steel, soft steel castings, etc., the latter method is preferable.

The writer wishes to make the preliminary statement that the cost of electric power enters only to a certain degree into the calculations, as it is only a small fraction of the total cost of production (about 3 per cent to 8 per cent for hot and cold charges respectively). It seems that this point is often misunderstood by some steel manufacturers, who appear to think that the electric furnace is destined to be used only where very cheap electrical power is available. Even with a town supply at a price of between 1 cent and 2 cents per unit, the production of electric steel is a commercial proposition of no uncertain merit. But in the waste gases from blast furnaces and coke ovens, a cheap supply is available for operations on a large scale, and it will be found that this is quite the most economical and profitable way of utilizing these waste gases, the other power requirements at the steel works being satisfied from some other source of supply.

For town supply stations, and even more for power supply companies, these electric furnaces will supply an excellent load on account of their high load factor (50 per cent and 75 per cent for hot and cold charges respectively). If operations could be arranged not to coincide with the peak loads of the supply stations, very low prices could be charged to the advantage of both the supply companies and the steel makers. At the Niagara Falls and other power centers in the United States this is actually being done.

In the Steel Foundry.

The next general use to which the electric furnace will be put is the production of steel castings both for high-grade and medium-grade products. The electric furnaces for these purposes will be generally of smaller capacities than those referred to before. They will replace the crucible

*Abstract of paper read before the Sheffield Society of Engineers and Metallurgists.

method, to which they are much superior, owing to the absence of the expensive and short-lived crucible with its inherent disadvantages of introducing impurities into the steel. In addition, the high temperature of the cast can be utilized in manufacturing complicated parts. Such castings have been made now for a considerable time in Girod, Stassano, Heroult, Kjellin, and other furnaces with complete commercial success, and they are distinguished by a very long elongation value (25 per cent with a breaking strength of 60,000 pounds per square inch) a low percentage of sulphur (0.03 per cent) and phosphorus (0.06 per cent). This is of particular value for such work as railway and motor car materials, light castings for flying machines, etc. The pure Lancashire and Swedish iron formerly used in the crucible furnace for this class of work cost $48.60 per ton, and the casting about $73 to $97 per ton. The cost of production of these steel castings in a one-ton Stassano furnace at the Bonn file works amounted to $43.75 per ton, including all capital charges. The reasons for this difference are—(a) The cheaper initial materials (scrap at $16 per ton). (b) The total cost of current (at 1 cent per ton), upkeep for furnace electrodes, etc., together $15.40, is considerably less than the cost of crucibles, coke, wages, etc., required by the crucible furnace.

Most Convenient Size of Furnace.

Moreover, the handling of a single pouring furnace is much easier than the separate handling of heavy and cumbersome charged crucibles. The charge of 1 cent per unit for power is a fairly high one for work of this class, and electric power can be obtained nearly everywhere in England at that figure from existing electric supply undertakings. It seems, therefore, that the days of the crucible furnace are numbered, and there is no excuse for up-to-date steel works clinging to the antiquated method of the crucible furnace with all its disadvantages. It seems to the writer that this particular field is a very promising one in Sheffield, and can be approached by steel makers without any misgivings as to its commercial results, as in most of the continental plants excellent results were obtained with untrained men.

The furnaces for this class of work should be from one to three tons' capacity, and the cost of such a furnace complete varies from $3,650 to $7,300 for a two-ton furnace, depending on the type chosen. The requirements for a furnace of this class are different from those of the first category. The small charges required, the desirable simplicity and safety in handling by the existing non-electrical staff, the necessity of using power from existing power supply undertakings, are all conditions which do not have the same importance in large installations of the first-mentioned class. A one-ton Stassano furnace will require about 200 kilowatts on an average during the four hours the power is required, using about 800 units per ton of steel produced.

No Longer a Novelty.

The production of steel castings by means of the electric furnace has been a commercial success from the very beginning, and the castings produced have been of a better quality in all respects. The plea one so often hears of "novelties which have not yet stood the test of commercial application" can in this case be answered with a list of works where castings are produced in an electric furnace at a price far below that of the products of the crucible furnace.

One or more electric furnaces of this type should be installed in every iron and steel works with any pretence of up-to-dateness, and if those responsible for the commercial management of these works would call in the help of the electrician, it would be seen that first cost is in this case not an insurmountable obstacle. Not only in iron and steel works, but also in naval and other ship yards, locomotive and carriage works, bridge building works, machine shops, electrical works, etc., small electric furnaces producing steel for castings should be indispensable. The very materials used, such as scrap, trimmings, stampings, punchings, steel and iron borings, etc., which are always produced at such works, point to the utility of such furnaces not only as refuse destructors, but as the means for producing castings at a very low price, thereby making the works independent of the foundries, and giving them better facilities for regulating their deliveries in accordance with modern demands for promptness.

Replacing the Converter.

The electric furnace will also replace the small converter which is now often used with or instead of the open-hearth furnace. Such a converter as a rule produces a quantity in excess of the requirements, so as to prevent the converter from cooling off. The electric furnace is a combination of the cupola furnace and the small converter, and produces a superior material (less sulphur and phosphorus) from an inferior charge ($14.50 instead of $21.50 for special pig) in smaller quantities, at a lower cost.

A further product to be made in the small electric furnace is malleable cast iron, which is now made in the cupola furnace, the crucible, the small converter and reverberatory furnaces at higher cost, at least for small quantities (on account of high fuel charges and expensive special pig iron used).

It will be necessary, however, to convince the managers of the works referred to that the two supposed bugbears, i. e., costly maintenance of the furnace and linings and heavy consumption of electrodes, are in reality unimportant, at least in some of the better known furnaces. A few figures taken from actual practice under discussion will be given farther on to illustrate these two points.

In fixing on a particular type of furnace it must be remembered that the initial charge to be used will in most cases be cold.

The Commercial Type.

A resistance furnace, or better still, a combination furnace, will fulfill the requirements, but all the Heroult, Stassano, Girod, and Rodenhauser furnaces have given excellent results for this class of work. Fairly pure materials will always be used, and if no refining but only smelting and "killing" is required, using very pure materials, a plain induction furnace such as the Kjellin will give an ideal crucible steel, as the furnaces of this class will not exceed two tons as a rule. With impure materials, where refining is required, the plain induction furnace is impracticable on account of its inherent electrical disadvantages and the difficulties of obtaining a hot and fairly liquid slag, and handling it.

Another type which combines the advantages of the pure resistance furnace (easy handling and regulation) with those of the arc-type furnace (adaptability to existing public supply and to all initial materials and products) is the Gronwall furnace, which uses two-phase current in two vertical electrodes, the common return or neutral being through the bottom lining of the furnace. This furnace is extremely simple in construction and requires no rotary movement on account of the vertical and horizontal

effect of the two phases. The cost of maintenance is small, the lining only consisting of a rammed mixture of dolomite, or magnesite and tar. The hottest part is also in the slag, as in the other types of arc furnaces, so that refining can be carried on until the desired result is obtained. The conditions which must be satisfied by a furnace for the practical purpose under discussion are: (a) Good thermal efficiency and high power factor combined with medium output. (b) Easy and simple handling, regulation and repairs. (c) Adaptability to all kinds of initial materials, hot or cold. (d) Must be capable of working with an ordinary three phase supply, and have a fairly constant energy consumption. (e) Must admit of using low voltage at the furnace. (f) Must admit of easy refining with a basic slag, even with impure materials high in sulphur and phosphorus contents. (g) The bath of molten metal must be homogeneous throughout, even after the refining process has been completed.

There is no type of furnace which unites all the above conditions in the same degree, and in the choice of a suitable furnace one must therefore be guided by local conditions and requirements; it is here that the expert will have to guide the decision of the works manager.

Without in the least attempting to advocate the use of any particular make of furnace, the writer wishes to enumerate the particular conditions which in each type of furnace have proved to be more especially fulfilled.

The conditions under (a) above, are better complied with by the Heroult, Girod, Gronwall and Rodenhauser furnaces than by others. Condition (b) is better satisfied by the Gronwall, Kjellin and Rodenhauser furnaces. Condition (c) by the Heroult, Girod, Stassano, Gronwall and Rodenhauser furnaces. Condition (d) by the Stassano, Gronwall and Rochling-Rodenhauser furnaces, and so far as the latter condition is concerned, also the Girod furnace. Condition (e) by the Girod, Stassano, Gronwall and Heroult furnaces. Condition (f) by the Girod, Stassano, Rochling-Rodenhauser and Heroult furnaces. Condition (g) by the Rodenhauser, Kjellin, Frick and Gronwall furnaces.

It may be stated generally that all the furnaces using vertical electrodes through the roof of the furnace offer the disadvantage of heavier repairs to the roof lining, due to the unequal heating, and that all furnaces using electrodes have the disadvantage of heavy energy losses (over 10 per cent) in the electrodes.

One of the future modifications will certainly be in the direction of metal electrodes used at an angle of 45 degrees. There are several modifications of each of these parent furnaces, but they do not offer material differences in construction, and their advantages and disadvantages are more or less the same as those of the typical furnaces from which they are evolved. Among the simple induction furnaces may be named the Frick furnace (differing only from the Kjellin furnace in the position of the coils), Colby, Hiorth, and Schneider furnaces. The resistance furnaces of the Heroult type, apart from the Girod type, are represented by the Kjellin, du Giffre, Gin and Anderson furnaces. The plain furnace is principally represented by the Stassano furnace.

In selecting a suitable type of furnace plant in accordance with local requirements, the only guide is of course the expert's advice, or to await the results obtained elsewhere.

OPERATING EXPERIENCES WITH A BLAST FURNACE GAS POWER PLANT

The First Authentic and Comprehensive Report of Performance Under Commercial Conditions.

By Heinrich J. Freyn.

(*Continued from* The Iron Trade Review of June 30.)

The Theisen washer, shown in section in Figs. 18 and 19, consists essentially of a closed drum fitted on its outer surface with longitudinal blades arranged in spirals. This drum, supported by a shaft in two water-cooled ring-oiling bearings, rotates at high speed inside of a stationary casing of conical shape. The inlet end is equipped with suction vanes while on the discharge end an exhaust fan is firmly attached to the drum. The gas is introduced into the annular space between revolving drum and conical casing and discharged by the fan into a water separator. The operation of the washer is as follows:

The suction vanes draw the gas from the inlet pipe and deliver it to the longitudinal vanes, which have an inclination to the axis of the drum so as to oppose the flow of the gas through the washer. The discharge fan at the outlet end of the drum, however, overcomes this tendency and discharges the gas under positive pressure of a few inches of water. The clearance between the outer edge of the longitudinal blades and the inner surface of the stationary casing is not more than 1 inch and the gas passing through this narrow space under high pressure imparts to the water introduced at several points into the casing a movement in long spirals in an opposite direction to its own travel. This flow of water in the form of a film covering the inner surface of the stationary casing, is assisted by the conical shape of the latter, tapering off towards the gas inlet. The surface of contact between gas and water is materially increased by wire netting, closely fitting the inside of the casing. By the intimate action of the water on the gas the dust particles are thoroughly moistened, and being weighed down by water drops, are thrown by centrifugal force into the rotating film of water, to be carried away through a seal into the sewer. The gas leaving the washer is charged with more or less moisture in the form of mist, which is removed from the gas in the Theisen washer separator, consisting principally of a removable box filled with iron shavings held in place by wire netting. The gas striking the iron shavings with great velocity deposits its moisture, and as it has to reverse its direction it cannot pick it up again, but leaves the separator in a comparatively dry condition. Gate valves serve for regulating the quantity of gas entering the different washers, and for shutting off any washer without interfering with the operation of the plant.

The two gas holders, of 100,000 cubic feet capacity each, were installed primarily to give a constant pressure of about 4 inches of water column at the gas engine throttle. Incidental-

ly, however, they serve as reservoirs and as water separators. Since a gas holder was originally not contemplated for the gas blowing-engine installation an additional water separator, shown in Fig. 20, was provided in the fine gas main to the gas blowing engine house, the design of which is based on a well-known principle. A number of angle irons serve as baffles, dividing the gas into a number of streams which are forced to change their direction several times while passing through the rows of angle irons. The latter are placed "straddling" similar to the wooden slats in the wet scrubbers. A bell valve at the end of a long pipe serves to remove the accumulated water. Each gas holder is of the single-lift type, with bell 59 feet 6 inches in diameter by 36 feet high. Both holders have separate gas inlet and outlet pipes to obtain continuous circulation in the holder and prevent the pocketing of stale gas. While in the power station holder this idea was carried out to the extent of having inlet and outlet pipes at opposite ends of one diameter, the blowing engine gas holder has these pipes side by side, but with the inlet turned a little to impart to the gas a rotating motion. Inlet and outlet pipes can be used as water seals to shut off the gas holder in case of necessity. To prevent the possible collapse of the gas holder bell, in case the supply of gas should be interrupted and a vacuum created underneath the holder bell, a disc valve supported by chains from the holder crown is located exactly above the mouth of the outlet pipe, as shown in Fig. 21. When the holder bell descends until it rests on its landing beams, this valve will close the outlet opening, preventing a vacuum under the bell.

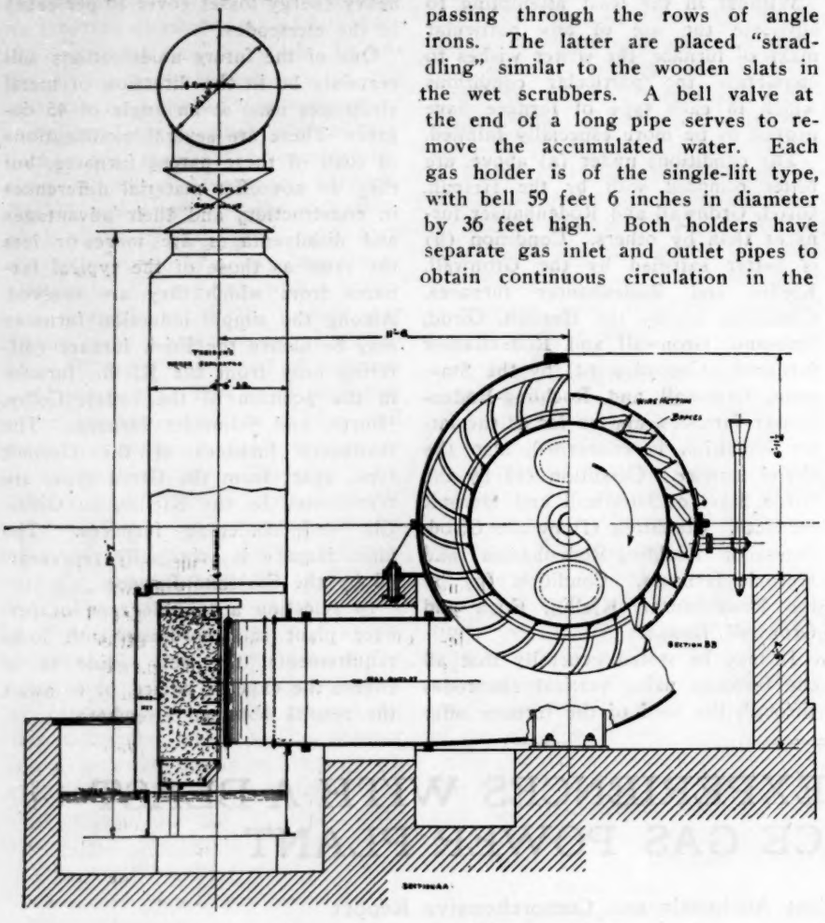


FIG. 18—CROSS SECTION OF THEISEN WASHER.

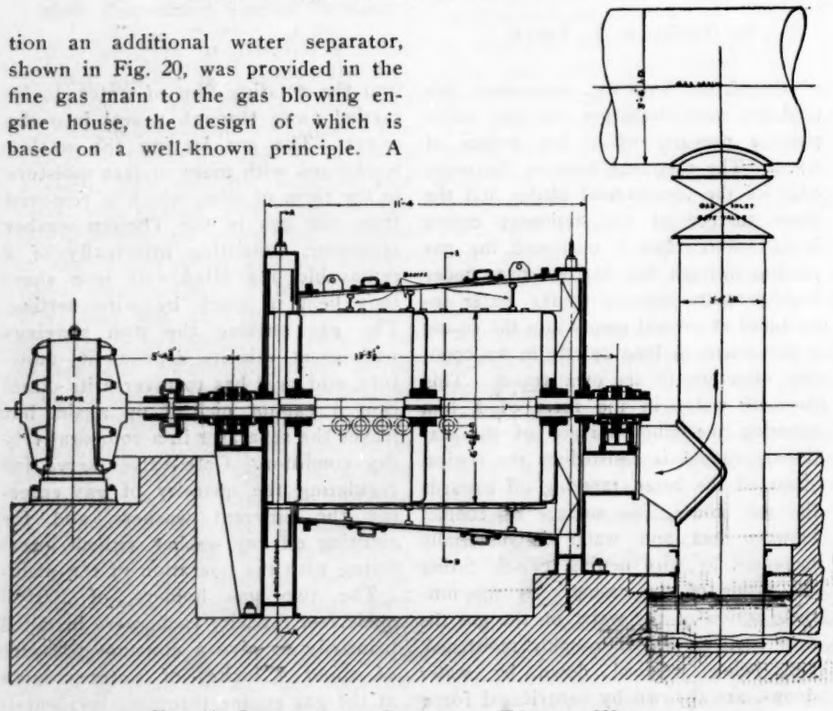


FIG. 19—LONGITUDINAL SECTION OF THEISEN WASHER.

Regulation of Gas Pressure.

The discharge pressure of the Theisen washers is about 8 inches higher than the pressure on the suction side, and as the latter is quite variable, the former will also vary within considerable limits. It is, of course, possible to regulate the pressure in the fine gas main by means of gate valves arranged in the Theisen outlets; but since these pressure variations are almost continuous, the gate valves would have to be adjusted by the operators practically all the time, unless it were desired to resort to the complication of electrically operated valves under automatic control of the gas pressure. To simplify this necessary regulation a butterfly valve was installed in the inlet pipe to each gas holder and operated by the holder bell itself by means of a wire cable fastened to it and carried over a system of pulleys, as shown in Fig. 21. This device worked in the following manner:

When the gas holder is empty, the butterfly valve is wide open and the counterweight hanger *H* with weights *W* is in its bottom position. When the bell ascends, hanger *H* rises without affecting the butterfly valve until bumper bracket *B* is reached, which prevents the further travel of the hanger. The movable pulley *P* now becomes stationary, and the rising holder bell acts through cable *C* on the butterfly valve, throttling and finally tightly closing it, the effect being precisely the same as if the gate valves on the Theisen washer outlets had been throttled or closed. The

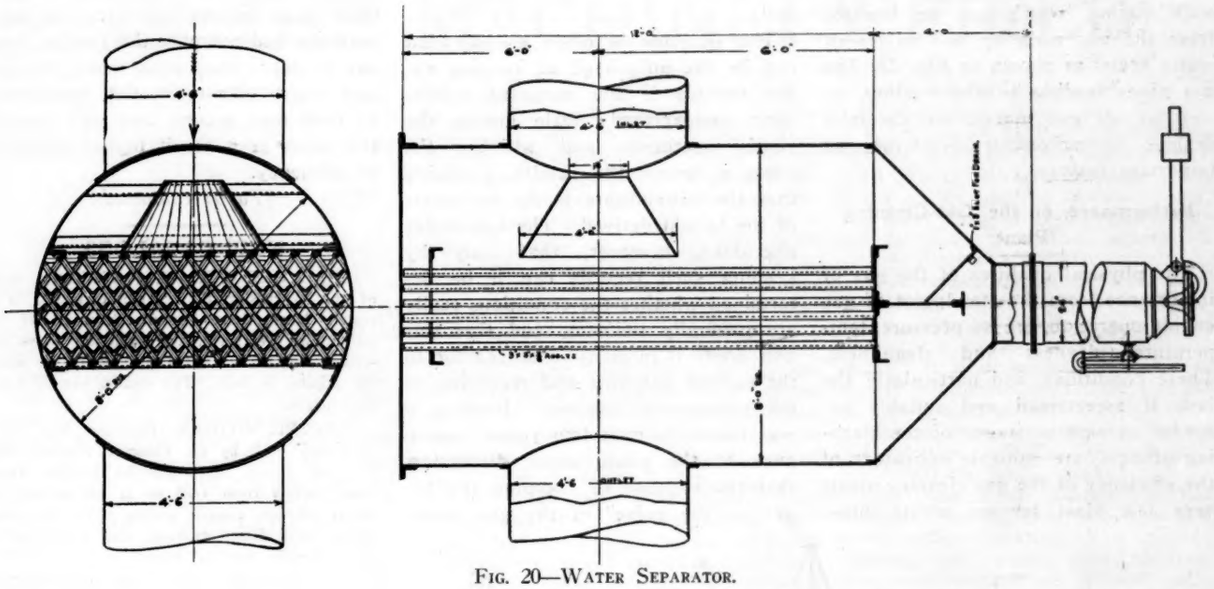


FIG. 20—WATER SEPARATOR.

washers continue to operate, but cease to deliver until the descending gas holder bell again opens the butterfly valve. This action is perfectly automatic and it is impossible for more gas to enter the gas holder than is being taken out, so that any number of gas engines can be started or shut down at any time without the slightest adjustment at the Theisen washers.

Without this automatic regulator this is what would happen: The weight of the gas container gives a constant pressure of 4 inches of water column in the outlet pipe and the Theisen washers deliver a constant quantity of gas as long as the gas pressure on the suction side is constant. With a certain number of gas engines in operation, and the gas demand equal to the gas supply, the gas holder bell will float in a certain position. If, however, one or several engines are stopped, the gas demand will decrease and as the gas supply remains constant the bell will rise into its top position, determined by the height of the water seal in the holder tank. Any further rise will break this seal, causing gas to escape from underneath the holder bell. This will continue until more engines are started and the gas demand is again equal to the gas supply, or until the Theisen outlets are sufficiently throttled to reduce the quantity of gas delivered. The disadvantages are obvious. Not only will the breaking of the seal cause large quantities of water to be thrown out, but the escaping gas, aside from being unnecessarily wasted, will dangerously foul the surrounding atmosphere. The automatic butterfly valve, balancing perfectly the gas demand and the gas supply, eliminates these troubles very effectively.

A by-pass line permits the operation of the gas engines directly if for any reason the holder is out of commission. Each holder delivers the gas into a large main located on the outside of the gas engine buildings. In-

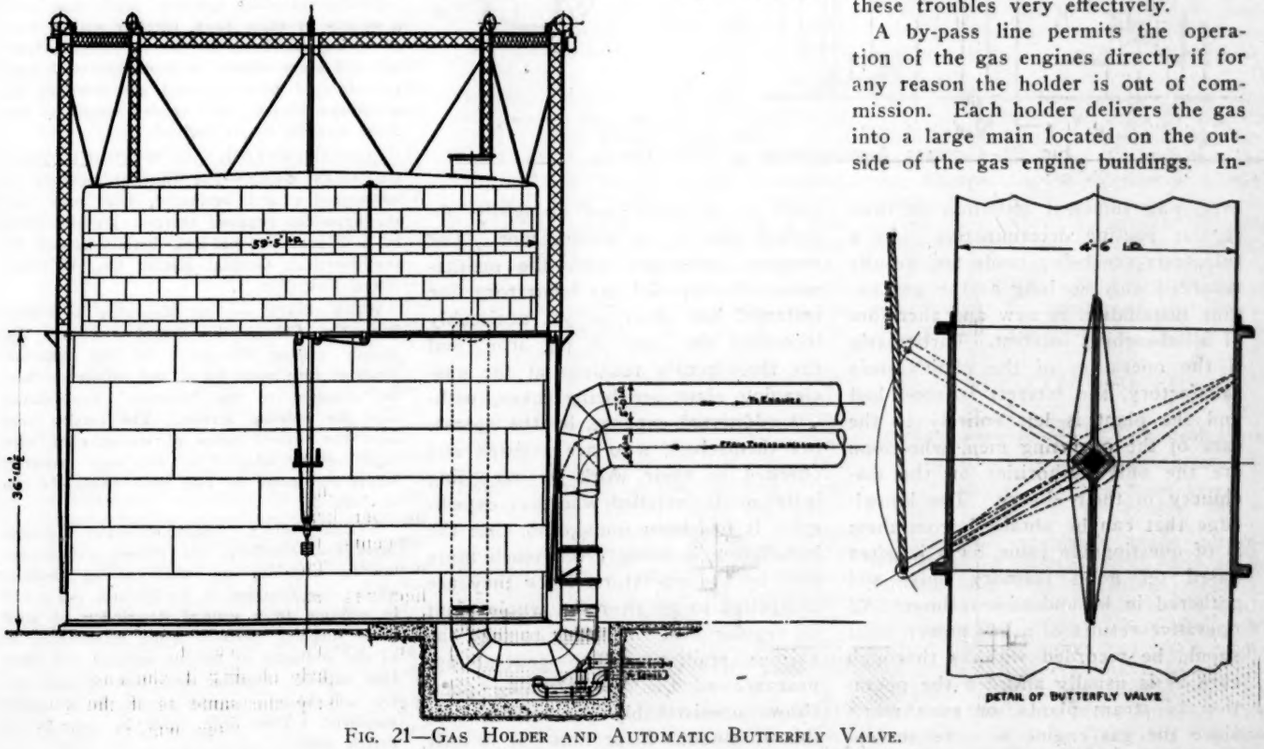


FIG. 21—GAS HOLDER AND AUTOMATIC BUTTERFLY VALVE.

dividual branch pipes lead the gas to each engine, which can be isolated from the gas main by bell valves or water seals, as shown in Fig. 22. The gas pipes leading to the engines, as well as all gas mains, are carefully drained by automatic overflows, an important feature.

Performance of the Gas-Cleaning Plant.

The physical qualities of the gas of importance from the standpoint of gas engine operation, are its pressure, temperature, dryness and cleanliness. These conditions, and particularly the last, if ascertained and suitably recorded at various stages of the cleaning process, are valuable indicators of the efficiency of the gas cleaning plant; very few blast furnace plants, however, pay sufficient attention to their regular routine determination. As a rule tests are being made and results recorded only so long as the gas engine installation is new and therefore of all-absorbing interest. Particularly if the operation of the plant seems satisfactory, the interest is soon lost and the plant is left entirely to the care of the operating men, who soon are the only authorities on the machinery in their charge. The knowledge that can be obtained from them is of questionable value, as it is often based on good memory only, and gathered in hit-and-miss fashion. All operative results of a gas power plant should be recorded with as thorough care as is usually afforded the operation of steam plants, or even more, since the gas engine is more susceptible to variations in the quality of its fuel.

The question is often asked, what can be the advantage of keeping exact records if the recorded results vary comparatively little during the year's operation, and whether the game is worth the candle, assuming that the expenditure is far in excess of the benefit derived. The questioner overlooks, however, that only by keeping such records can it be determined whether the conditions really are generally uniform; and that this uniformity is in many instances due to the careful watching and recording of the phenomena involved. Besides, it was found, in over two years' experience at the plant under discussion, that the expense of "keeping the finger on the pulse" of the gas power plant is so small and so easily absorbed that it is insignificant. The expense connected with the maintenance of a special gas laboratory, for instance, has never as yet noticeably increased the cost of pig iron, and the three-hourly readings at the gas-cleaning plant are being taken, without additional expense, by the operators themselves, who are assisted and checked in their work by recording instruments installed wherever expedient. It has been found, too, that the installation is being given much more care by the operators, since they are compelled to go over the whole plant on regular beats, in order to take the various readings. The general appearance of the gas cleaning plant shows unmistakably the influence of this continuous inspection. It is only natural that the operators should themselves become interested in their readings and compare the results from day to day. They soon make changes and improvements in the equipment, of their own accord, and will operate the plant at a much higher standard of efficiency.

(To be continued.)

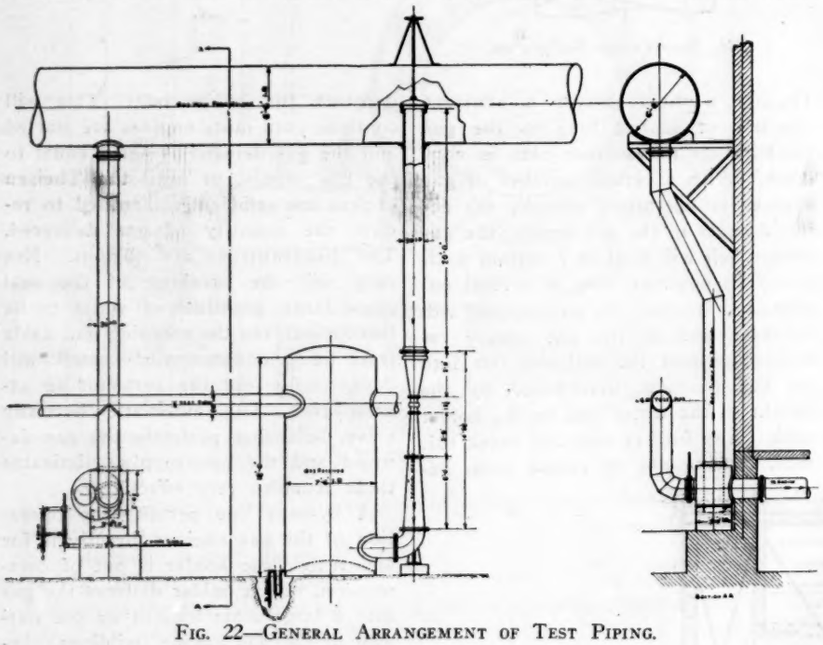


FIG. 22—GENERAL ARRANGEMENT OF TEST PIPING.

NEW CATALOGS.

DRILL GRINDERS.—The Washburn shops of the Worcester Polytechnic Institute, Worcester, Mass., have issued catalog E of the well-known Worcester drill grinder, which describes the various sizes and styles in which the grinder is built. The catalog has 20 6 x 9-inch pages.

ELECTRIC MOTORS.—Bulletins Nos. 3217, 3707 and 3962, by the Emerson Electric Mfg. Co., St. Louis, Mo., describe bi-polar ventilated motors from 1/20 to ¼ horsepower for direct current, electric buffing lathes for alternating and direct current, and small motors for domestic service, respectively.

GAS COMPRESSORS.—The Ingersoll-Rand Co., 11 Broadway, New York, is distributing its form No. 3017, 32 6 x 9-inch pages, descriptive of a large line of gas compressors in various designs and sizes and adapted for driving either by direct steam, gas engine or power.

CORE OVENS.—The J. D. Smith Foundry Supply Co., Cleveland, is distributing a 10-page pamphlet describing a notable installation of rolling drawer core ovens in a plant which is said to be the largest in the world in its particular line.

MOTOR TRUCKS.—The American Motor Truck Co., Detroit, Mich., in a 24-page 9 x 12-inch catalog describes its 1910 model of 5-ton motor trucks, which embody the unique feature of driving through both front and rear axles, regardless of the swinging action of the former.

SAWS.—Circular, cylinder, band, drag and a variety of other saws, together with a line of sawing machinery for staves, shingles, lumber and every variety of cooperage stock and a variety of other material are described in a 32-page 3½ x 6½-inch catalog issued by the Peter Gerlach Co., Cleveland.

CONCENTRATION AND BRIQUETING OF IRON ORES.—The Grondal methods of concentrating and briqueting iron ores and the apparatus required therefor are set forth in a 22-page 8½ x 11-inch booklet issued by the American Grondal Kjellin Co., 45 Wall street, New York.

WIRE ROPE. — The Macomber & Whyte Rope Co., Chicago, has issued a 64-page 7 x 10-inch catalog descriptive of the different kinds of rope made by it, and calling particular attention to the "Kilendo" non-rotating rope for hoisting service. The catalog contains the revised tables of strengths of wire rope recently adopted by wire rope manufacturers and noted in THE IRON TRADE REVIEW of June 2.

STEEL MINE TIMBERS.—The Carnegie Steel Co., Pittsburg, has revised and rewritten its pamphlet on steel mining timbers, which now contains 58 5 x 7½-inch pages, and in addition to a general description of steel mine supports contains much information as to the strengths of various sections and their load capacity, together with that of oak, yellow and white pine and spruce, as ordinarily employed. This little work is now in its fourth edition.

IN THE MACHINERY FIELD

NEW YORK.

Gradual Slowing Down Seems to be in Progress.

Office of THE IRON TRADE REVIEW, 1115 West Street Bldg., July 5.

Generally speaking, the conditions prevailing in the local machinery trade are in line with the usual trend of business at this time of the year. At some points signs of activity will be noted, while at others definite statements are made of exceptional prosperity, but the aggregate of a general survey shows unmistakably that a gradual slowing down is under way, and that nothing more than spasmodic betterment is looked for until the autumn season opens. There is little real complaint heard, as the seller, as well as the buyer, feels the influence of the vacation period and has confidence in the return of activity coincident with the return to the post of duty of the many now seeking rest and pleasure. In the machine tool trade it is said that the New York Central Railroad has verbally committed itself to a part of the extension list put out some weeks ago, but bids have not yet been accepted formally. The Delaware, Lackawanna & Western railroad continues to deliberate on its requirements, but the inference has been drawn from intentions that something decisive will be heard from this company during this or early next week. The local building trade keeps up well and affords a good market for power machinery, as well as general contractors' equipment.

The meeting of the association of Licensed Automobile Manufacturers took place in New York Wednesday and was largely attended. It developed that all members reported a good demand for cars, and a particularly bright outlook for the commercial branch of the business.

The Vanderbilt Hotel Co., New York, is in the market for about $30,000 worth of machinery for installation in an electric plant for its hotel building now under construction on upper Broadway, New York City.

The West Shore Railroad Co. has purchased a tract of 17 acres of land in the township of North Bergen, N. J., adjoining its present car shops, and will utilize the property for car shop extensions and freight yard purposes.

The Lynchburg Foundry Co., Lynchburg, Va., which is planning the erection of an additional modern cast iron pipe works at Roanoke, Va., is now building the greater portion of the manufacturing equipment in its own shops. As a consequence, the company will not purchase a lot of machinery for the new plant but will require some equipment for a power plant. Active construction upon the new foundry has not yet been inaugurated but the plans are now in preparation. The new plant will be a model of its type, embodying many distinctly new features.

The Bucyrus Company of South Milwaukee, Wis., has sold a number of shovels for shipment to Alaska, where they will be used in placer gold mining operations. This branch of the business has become so important to the firm that George B. Massey, the New York sales agent, has been sent to Alaska on an extended trip to look after new business. In the southwest there is more machinery of this heavy type being used than ever before.

The Pulsometer Steam Pump Co., 16 Battery Place, New York, N. Y., has recently made a shipment of six steam pumps to Japan. The company has also sent, for exhibition purposes, one of these pumps, with boiler, mounted on a truck, to China.

The Diamond State Fiber Co., Bridgeport, Pa., is having plans prepared for a new boiler plant of 2,400-horsepower which will be equipped with mechanical stokers, induced draft, pumps, feed water heater, and an overhead coal bunker of 1,000 tons capacity.

The Kerr Turbine Co., New York, N. Y., has been awarded the contract for four turbo-electric generating units for lighthouse service at Tompkinsville, Staten Island, N. Y.

The International Harvester Co. will build at Albany, N. Y., a warehouse 100 x 150 feet. Power elevators will be required.

The Hart Mfg. Co., makers of electrical supplies, Hartford, Conn., will build on Bartholomew avenue, a four-story factory, 60 x 250 feet.

Shiman-Miller, makers of jewelry, Newark, N. J., contemplate the erection of a five-story brick addition, 40 x 100 feet.

The business of the Goubert Mfg. Co., with works at Bayonne, N. J., which was recently disposed of by the receiver for the Goubert Co., has been purchased by the Griscom-Spencer Co., 90 West street, New York. The latter company will exercise the patent rights of the Goubert specialties and with that end in view has secured the services of A. A. Goubert to take charge of this addition to its business. The manufacturing of the Goubert feed water heater and Stratton steam separator, will be carried on by the Griscom-Spencer Co., on a larger scale than ever.

It is reported that plans for a connecting link between the new tunnel of the Pennsylvania railroad and the Steinway tunnel, under East River, and for a transfer station at the Hunters Point terminal of the Steinway tunnel in Long Island City, are under way. Efforts to confirm the reports, while not altogether successful, justify the assumption that it is true, and that the Pennsylvania Co. will probably finance the construction.

The Windham Silk Co., of Hartford, Conn., are having plans prepared for an addition to its plant.

The construction of the new building of the Willimantic Machine Co., Hartford, Conn., is nearing completion and the indications are that the plant will be up-to-date in every feature.

W. Weissenberger, Jr., architect acting for the New York Edison Co., has filed plans with the building department for an addition of two stories to the eight story office and power building at Duane and Elm streets. The cost is placed at $70,000.

Westinghouse, Church, Kerr & Co., 10 Bridge street, New York City, is asking bids on 300 tons of structural steel for a power house at Worcester, Mass. It is understood that the necessary equipment orders for this plant will be placed soon.

The Cuban government has approved the proposed expenditure of $3,000,000 on public works.

The New York Edison Co. has a contract for lighting the new police headquarters building, New York. A lighting and heating plant to cost in the neighborhood of $80,000, will be installed.

The Hamilton Ice Co., of Camden, N. J., is to increase the capacity of its boiler plant. Two or three new boilers will be installed.

The Jos. Campbell Co., of Camden, N. J., will build an addition to its soup factory at Camden, N. J.

Manning, Maxwell & Moore have opened a warehouse at 446 Communipaw avenue, Jersey City. The building has 2,700 feet of floor space and is equipped with a 7½-ton electric crane.

The franchise of the Manhattan bridge 3-cent fare line has been granted by the board of estimating and apportionment. As soon as the company secures the certificate of public necessity from the public service commission it can begin operation. According to John C. Breckinridge, vice president of the company, the cost of power house, car barns, trackage, cars, etc., will be about $650,000.

The park board of New York City will receive bids until July 21 for the materials and labor required for furnishing and installing the electric lighting fixtures in the Metropolitan Museum of Art.

The Geo. Ehret automobile industry building will be erected on the east side of Broadway, at Columbus circle, at a cost of $120,000. John R. Hinchman and Walker & Hazard, 437 Fifth avenue, are the architects.

PITTSBURG.

Improvement Noted in Condition Here —Outlook is of the Brightest.

Office of THE IRON TRADE REVIEW, 510 Park Building, July 5.

The local machinery trade continues to show improvement, and, notwithstanding that the usual midsummer quietness is noted in some quarters, local machinery makers have submitted bids on equipment for a number of new projects, and it is expected that some large awards will be made in the very near future. The American Sheet & Tin Plate Co. has awarded contracts for most of the ma-

chinery and equipment for the new mills at Gary, Ind., and it is expected that the entire list will be finished within another week. A number of the plants in the Western Pennsylvania district have figured in the awards, and the placing of these orders will insure steady operation for some time.

The outlook for the machinery trade during the last half of the year is exceedingly bright, as a number of prospective builders who have been holding up awards for some time state that it is their intention to take up a large portion of this work as soon as possible. It is stated that there is a greater amount of new work, involving all kinds of machinery, now being estimated than for a long time past. Builders of cranes report that there is considerable business going in this line and that the total bookings for the month of June exceed those of any previous month this year. One or two companies report having booked an average of one crane a day all during the month. Twenty-three cranes are involved in the awards made by the American Sheet & Tin Plate Co., and this work has been distributed among six builders.

One of the disappointing features of the local market is the fact that while the railroads are buying heavier than a month or so ago, they are still holding up awards in connection with extensive lists announced some time ago.

The Buffalo, Rochester & Pittsburg Railway Co. has awarded a contract to the Otto Gas Engine Works, Chicago, for the erection of a bucket type mechanical coaling station of 500 tons storage capacity, at Lincoln Park, N. Y., as well as a similar station of 1,200 tons storage capacity at Du Bois, Pa., where the company's principal repair shops are located. The company has also awarded a contract for a brick and stone passenger station at Springville, Pa. It is reported that the company's shops at Du Bois will be enlarged, or that a small repair plant will be built to handle repair work along the Indiana branch.

The Dunbar Furnace Co., Dunbar, Pa., has practically completed improvements to its No. 1 stack. A heavy duty blowing engine built by the Mesta Machine Co., West Homestead, Pa., has been installed and is being operated in connection with the other furnace. New air lines have been constructed for both furnaces. The company's No. 2 stack has been operating continuously for four years.

The Sharon Steel Hoop Co. has made an appropriation of $150,000, and is preparing plans for the erection of a band mill at its Sharon, Pa., plant. At the present time the company manufactures all kinds of hoops and other finished products.

Bids are being submitted on the equipment for the new steel mill to be built in Belmont county, O., for the Whitaker-Glessner Co., and it is expected that contracts will be awarded within the next week or 10 days. As announced recently, the initial equipment will consist of three 60 to 75-ton open-hearth furnaces.

H. J. Koontz, Pittsburg, has purchased the Cheswick, Pa., plant of the Pennsylvania Swedish Iron Co., which consists of an all-steel structure 80 x 120 feet, erected five years ago.

Wickes Bros., Pittsburg, are installing a large haulage engine at the Edensburg, Pa., plant of the Springfield Coal Mining Co., and report a decided improvement in business conditions.

Several of the larger coal and coke companies are preparing estimates on new equipment to be installed at their various plants. George E. Price, H. B. Smith, R. S. Spillman, R. M. Price and B. Clay, of Charleston, W. Va., are named as incorporators of the Davy-Pocahontas Coal Co., which has just been chartered under the laws of West Virginia with a capitalization of $500,000. It is understood that the company will open a new plant near Welch, W. Va. The Melania Coal Co., of Uniontown, Pa., has been organized with a capital of $150,000. It is stated that both companies will enter the market in the near future for machinery to be installed at plants to be opened this year.

Standard Gauge Steel Co., Beaver Falls, Pa., will install a 250 kilowatt direct-current engine type generator to be built by the Crocker-Wheeler Co., of Ampere, N. J.

Bids have been readvertised for the construction of a steel water reservoir of 175,000 to 200,000 gallons capacity at the western Pennsylvania penitentiary. Plans, specifications and forms for bidding and all information may be obtained from Samuel E. Duff, consulting engineer, Empire building, Pittsburg.

The Riverside Metal Refining Co., of Connellsville, Pa., is installing two electric furnaces of the shaft type, with one carbon through the bottom, this being the permanent carbon, and the other one through the top being movable. The slag used is on the bottom with the top carbon immersed in it to the depth of three or four inches. The furnaces are used for smelting drosses and are 20 inches in diameter, taking care of about two tons of dross per day. They can be used individually, in series, or in multiple. They use a single phase current and have a voltage and current range of wide dimensions, both on account of the transformers used and the furnaces themselves. Current is obtained from the West Penn Railways Co., and the furnaces are used exclusively for tin and terne drosses.

MILWAUKEE.

Orders Few and Inquiries Lacking—Future, However, Looks Promising.

July 5.

The local machinery situation, while inclined to be somewhat slow at the present time, is taking on a better color and the volume of business done by the Milwaukee manufacturers is gradually increasing. Many orders have been received during the past week, but the majority of them are for future shipment. Conditions, however, look promising.

The Milwaukee Stamping Co. will commence operation in its new plant during the next two weeks. The new plant of the Sterling Wheelbarrow Co. is also being rushed toward completion.

The J. J. Vollrath Mfg. Co., of Sheboygan, Wis., has awarded contracts for the erection of its new plant. The Wisconsin Bridge & Iron Co., of Milwaukee, will do the steel work.

The plant of the Schaefer Mfg. Co., at Berlin, Wis., is being run to capacity to fill its orders for the Big Four Washing Machine Co., of Ripon, Wis. Since Jan. 1, 1910, 77 gross tons of castings have been made for this concern.

Equipment for the plant of the recently organized Jefferson (Wis.) Auto Supply Co. has arrived in the city and is being installed as rapidly as possible.

The C. A. Schaler Co., of Waupin, Wis., has commenced the erection of a new two-story reinforced concrete factory building, 30 by 130 feet, to be devoted to the manufacture of the Shaler Electric Vulcanizers.

Negotiations are being carried on between the officials of the Standard Metal Manufacturing Co., of Chicago, and business men of North Fond du Lac, Wis., for the removal of the company's plant to that city. It is likely that a deal may be completed.

The Tobacco Machinery Co., of Milwaukee, is placing a new spearing machine on the market, which is said to contain many improvements over the one produced last year and to enable more work to be done at a smaller cost of operation.

The board of public works of the city of Waupun, Wis., is planning to purchase new equipment and enlarge the municipal power house.

City Engineer Kirch is preparing plans for the erection of a new $20,000 steel bridge at Janesville, Wis., crossing the river at Fourth avenue.

It is reported that the Templeton-Barrett Co., of Milwaukee, manufacturer of jewelry and hardware specialties, is planning to remove its plant to one of the smaller cities of the state.

L. H. Howard has sold his machinery business at Neillsville, Wis., to Fred Stelloh. Mr. Howard will continue to operate the garage, repair and machine shop and will do a general automobile business in the future.

Plans have been completed and building operations will be commenced immediately on the erection of the new plant to be erected by the Beaver Dam Foundry Co., at Beaver Dam, Wis.

L. M. Romer has opened a machine shop at Glenwood, Wis. Equipment is now being installed and the plant will be in operation within a short time.

A. Gustav Seberg, of Racine, Wis., has secured a patent on a drilling machine and placer mining apparatus, and the Seberg Manufacturing Co. has been formed to manufacture the machines. The drill, it is claimed, can be

used in cutting either up, down or sideways and will penetrate 30 feet of stone a day. The hammer used in striking the drills is said to deliver a blow of 23 tons and is operated by centrifugal force. The company plans to manufacture the machines and put them out on royalties.

The Adams Threshing Machine Co., of Oshkosh, Wis., has filed an amendment to its articles of incorporation increasing its capital stock from $25,000 to $200,000.

The Holbrook-Armstrong Iron Co., of Racine, Wis., is installing $40,000 worth of new equipment of automobile engines.

The Racine-Sattley Co., of Racine, Wis., will commence the manufacture of automobiles and plans to have a car on the market for the 1911 season. Plans and specifications which have been drawn up, call for several original features.

CHICAGO.

Very Few Sales Reported—Business Dull and Inquiries Lacking.

Office of THE IRON TRADE REVIEW, 1328 Monadnock Block, July 5.

The local machinery market is enjoying its full share of traditional midsummer dullness, as the almost universal report is that great quietness prevails. A little scattered buying is being done by the general machine shop trade, but nothing has been reported in the way of machinery lists since the two that were published in THE IRON TRADE REVIEW, last week. Agencies are sending out their salesmen not so much with the hope of selling machinery at the present time, as with the purpose of holding the territory by doing missionary work.

The firm of Adkins, Young & Allen, who represent a number of eastern steam pump manufacturing companies, will remove, Aug. 1, from their present quarters at 23-25 N. Canal street, to 109 N. Canal street.

Plans and specifications are being prepared for an additional building to be erected at the plant of the Columbia Tool Co., Chicago Heights.

The Standard Metal Mfg. Co., of Chicago, is negotiating for a location in one or more towns outside of Chicago, Fond du Lac, Wis., being one of the towns under consideration.

The C. G. Folsom Mfg. Co., manufacturer of heavy sheet iron, structural and tank work and automobile accessories, will increase its capital stock to $125,000.

A machine shop and automobile garage is to be built at La Grange, Ind., for Blough & Fisher.

The Eclipse Mfg. Co., of Springfield, Ill., which located in that city about three months ago, is about to double the size of its present plant by taking over the Lorimer Novelty Works. The company manufactures a lubricating force pump.

A large quantity of machinery has been received at Racine, Wis., by the Holbrook-Armstrong Iron Co., to be used in the manufacture of automobile engines.

The Continental Car & Equipment Co., of Louisville, Ky., has appointed J. C. Campbell & Co., First National Bank building, Chicago, as its western sales agents.

CLEVELAND.

Weak Market Marks Close of June—Stocktaking Holds up Many Orders.

Office of THE IRON TRADE REVIEW, Penton Bldg., Chestnut and E. 12th, July 5.

The last week in June in Cleveland machinery circles was marked by a decided slackening not only of sales, but also of inquiries. The automobile manufacturers are holding up on their specifications, and are buying from hand to mouth as regards their supplies. The general machinery outlook for this month is not good, as a number of firms take stock during July and will be out of the market until after this work is completed.

A new boiler house, to cost in the neighborhood of $15,000, will be erected by the Leisy Brewing Co., Cleveland. Construction will start within the next few weeks.

A large automobile garage has been constructed by the Price Implement Co., of Zanesville, O. The equipment is not yet fully completed.

The McKenna Co., dealer in contractors' supplies, reported business closed as very slight, but it has several good prospects in view and inquiries with it are fairly numerous. It is feeling no anxiety owing to the temporary lull in actual business closed.

H. C. Adams, of Toledo, O., is interested in the organization of a company to build and operate a street car line extending from the present Ottawa Park line, about nine miles, to Monie street, Toledo. The right of way has been secured and it is expected that construction work will be started in the near future.

The Osborn Engineering Co. is preparing plans for the construction of a one-story brick and steel power house, 131 x 120 feet, and 380 x 120-foot foundry, for the Lima Locomotive & Machine Co., of Lima, O. Bids for the buildings were opened last Saturday, but it is understood that no award was made nor have arrangements been made as yet regarding the equipment.

The Bruce-Macbeth Engine Co., manufacturer of vertical multi-cylinder gas engines, reports business as having been very good with it for the past few weeks. It has recently sold engines to the following concerns: The Leon Silk Mills, Bradford, Pa., 135 horsepower; G. Elias & Bro., Buffalo, N. Y., 150 horsepower; Fostoria Glass Co., Moundsville, W. Va., 135 horsepower; J. M. Dean, Putnam, Conn., 100 horsepower; The Monongah Glass Co., Fairmont, W. Va., 135 horsepower; The Electric Storage Battery Co., Cleveland, O., 135 horsepower; The Cleveland City Forge & Iron Co., Cleveland, O., 115 horsepower; The First National Bank Building, Columbus, O., 115 horsepower; The Institute for Feeble Minded (2), Polk, Pa., 200 horsepower; The W. W. Sly Mfg. Co., Cleveland, O., 115 horsepower; The Excelsior Shoe Co., Ironton, O., 135 horsepower, and the Maxapil Copper Co., Saltillo, Mex., 100 horsepower. It has also sold a number of smaller-sized engines.

The Rauch & Lang Carriage Co., Cleveland, is building an addition to its power house. Bids for the construction work have been received by the Osborn Engineering Co., and it is expected that the award will be announced some time this week.

The W. H. Welch Machinery Co. reports business as quiet and lacking in both inquiries and sales. It found inquiries on specialties fairly good, but the demand for machine tools was very slack. It is of the opinion that business will improve about the middle of the month, however.

Plans are being drawn for considerable additions, which include a new machine shop, to the plant of the W. H. Miller Mining Supply Co., Columbus, O. The machine shop is to be fitted with the most up-to-date equipment.

The Seagrave Co., manufacturer of self-propelling fire apparatus, South Columbus, O., is having plans drawn for extensive additions to its plant.

The Foster Gear Co., Columbus, O., which succeeds the Columbus Screw & Machine Co., will build an addition to its plant and install a considerable amount of machinery.

New boilers, etc., will be installed in the Ohio state hospital for the insane at Columbus, O.

The Fostoria, Napoleon & Defiance Railway Co. has asked for a franchise to build an electric railroad through Napoleon, O. Address Chas. A. Bliss, Bowling Green, O.

The New York, Chicago & St. Louis Railroad Co. will spend approximately $200,000 at the Euclid avenue crossing in Lakeview in the erection of a passenger station. A. J. Hines, Cleveland, is engineer of grade elimination.

The clerk of the board of education, Cleveland, will receive bids until July 18 for furnishing the materials and doing the work necessary for the completion of the school building to be known as the Glenville high school annex. Chas. Orr is the director of schools.

All bids received for the erection of a new high school at Toledo are above the estimates and there is a possibility of the contracts not being awarded.

The General Electric Co., of Toledo, O., has taken out a building permit for a brick and cement extension to its factory, at a cost of $160,000.

The W. M. Pattison Supply Co. reports several small orders for last week, but says that business was by no means good. Inventory taking has held up several orders long promised, but it anticipates an increase in its trade about the middle of the month.

BUFFALO.

Dullness Felt in Machinery Market, But Improvement is Expected.

Head for Chicago Machinery

Office of THE IRON TRADE REVIEW, 932 Ellicott Square, July 5.

The midsummer dullness has been noticable in the machinery market this week and little business has been closed though a few good inquiries are coming in. The demand for machine tools has been practically nothing, and

fewer sales of small tools have been made than a week ago. There has been some demand for electrical equipment, though business has not been as brisk in this line as usual. Dealers look for some improvement after the plants have finished taking inventory.

The Jewell Steel & Malleable Co., which was recently incorporated, has announced its intention of proceeding at once to erect a plant. Though the location has not been settled, plans are being prepared, and some of the equipment has been ordered. The company is still in the market for some tools including two drills, two lathes, an air compressor, a motor, a dynamo and three grinding machines. The company will put in a 15-ton melting furnace and four annealing ovens. The officers originally intended to build the plant at Buffalo, but there has been correspondence relative to locating elsewhere, and it was stated that the plant may be built at some other point. It will require about four acres of land. W. E. Jewell is president of the company and A. W. Valentine secretary-treasurer. Mr. Jewell is general superintendent of the Acme Steel & Malleable Iron Works and Mr. Valentine has been connected with the sales department of the same company for the past 10 years. The new company will manufacture a general line of malleable iron.

The city is considering the purchase of two steam turbo-generators of 5,000-kilowatt capacity for use at the new pumping station and also generators for lighting the streets and public buildings. If resolutions introduced in the common council are passed, bids will be asked by the commissioner of public works.

Within a short time the board of supervisors of Erie county will advertise for bids for the installation of a power plant for heating and lighting the penitentiary at Buffalo, costing about $40,000. Bids for this work were asked some time ago, but the cost was considerably greater than the supervisors expected, so they have reduced the specifications.

The Jamestown Art Carving Works has been incorporated at Jamestown with $28,000 capital to do wood carving for furniture manufacturers. The incorporators are, Albert Nelson, Raymond A. Nelson, and Frank Lennon, all of Jamestown.

Alfred Carlson, Carl J. Johnson, and John A. Nord are the incorporators of the Jamestown Table Lock Co. which has a capital of $3,000.

The structural iron erectors who were on strike for a higher wage scale have returned to work at 55 cents an hour. They had been getting 50 cents an hour and asked 60 cents. The new agreement will remain in force for two years.

Word has been received from Rochester to the effect that the Canandaigua Gas Light Co. is erecting a large plant which will be ready in about a month. The company intends ultimately to double its capacity. The plant will be of the usual coal gas type, using the usual apparatus. The daily capacity is estimated at 100,000 feet.

The village of Pike, N. Y., is advertising for the construction of a gravity water supply system. The village will furnish the pipe, hydrants, valves, valve boxes, etc. T. H. Culver is president of the village.

The Lodee Pump Works is moving into its new plant. Most of the equipment has been ordered.

The Beaver Manufacturing Co. will be ready to move into its new plant in about two months. Practically all the orders for equipment have been placed.

The Thornton & Chester Milling Co. is moving into its enlarged plant as fast as the various parts are completed, the old plant being kept running. The moving will probably not be fully completed until December. The company has just installed a 500-horsepower engine and two boilers, bringing the power up to about 700 horsepower.

The Society for Deaconess Work, Bunalo, has just filed plans for a boilerhouse at 549 Riley street, costing $18,000.

The Vacuum Oil Co. has decided to move a large part of its manufacturing business for the export trade from Rochester to the seaboard. A plant is soon to be built at Bayonne, N. J.

Plans are now being prepared for a plant to replace that of the Milo Paper mill, Penn Yan, destroyed by fire recently. The mill will be modern in every particular, and considerable equipment will be required.

The Dansville Gas & Electric Co. has been authorized by the public service commission to issue bonds to the amount of $10,000. The company intends to use the proceeds for extensions and improvements at the Dansville plant.

The H. P. Robertson Co., Jamestown, makers of furniture, are building a four-story, 40 by 90-foot addition to its factory.

Col. Fisk, United States engineer, has sent to the engineering board at Washington the bids for completing the locks in the ship canal at Black Rock. The D'Olier Engineering Co., Philadelphia, is the lowest bidder if the cable system of regulating the lock is used, and the Penn Bridge Co. if a system of spar gate operating machinery is selected. The specifications call for five steel lock gates, eight sets of lock gate cables, six Stoney culvert valves and a pumping plant.

A number of fruit growers of Orleans county have organized the Holley Cold Storage & Fruit Co., and are about to build a cold storage plant. A large part of the $50,000 capital has been subscribed. The company has its office at Holley, N. Y.

The Hornell & Bath Interurban Ry. Co. is about to issue bonds to the value of $195,000, the proceeds to be used for the construction of a line from Hornell to Bath. This is in addition to $450,000 issued some time ago.

The Seneca Falls Folding Box Co. is moving into its new building at Seneca Falls. Some new machinery is being added. B. H. Delevan is general superintendent.

The Poughkeepsie Light, Heat & Power Co., the Newburgh Light, Heat & Power Co. and the Hudson County Gas & Electric Co. have asked the public service commission for permission to consolidate.

Elevators and heating equipment will be needed for the Portage Hotel at Akron. The general building contract has just been awarded to George Baker Long, Chattanooga, Tenn.

The Gillie Engine Co., Tonawanda, N. Y., has purchased an additional building adjoining its present plant, which it will convert into a boiler shop.

The Fireproof Film Co. has purchased a site in Rochester and will erect a plant for the manufacture of films and photo supplies.

The B-C-K Motor Co., of York, Pa., has awarded a contract for the erection of a three-story addition, which it will use for general automobile manufacturing purposes and in which it will install new machinery.

A site has been secured in Corry, Pa., by a new concern known as the Corry Metal Furniture Co., on which will be erected a plant for the manufacture of metal bedroom furniture. Jas. P. Brown is secretary of the company.

BOSTON.

June Closes Quiet and There Are No Big Developments in Sight.

July 5.

The 12 print goods machines of the Hamilton Print Works of Lowell, Mass., which was bought outright recently by the Pacific Mills of Lawrence, Mass., will be shipped to Lawrence as soon as possible. In the place of the print shop there will be erected a weaving mill of large capacity, plans for which are already under way.

Other than the opening of this tentative large contract, there has been little development in the New England district the past week.

William J. Dunn, of Fall River, has bought the Glenark Knitting Co., of Woonsocket, R. I., for $24,075. The property is taxed for $61,000. The machinery was sold in lots.

The machinery of the woodworking factory of E. S. Emerson in Webster, Mass., was sold Wednesday at auction.

The Lawrence Dye Works, South Lawrence, Mass., is making excavations for a new four-story plant, and a new boiler house.

Twenty-two broad looms with other complementary machinery will be added to the equipment of the Brampton Woolen Co.'s plant at Newport, N. H., when the weave shed, 90 by 90 feet, now under process of construction is completed.

The plants and machinery of the Wyoming Yarn Co., of Richmond, R. I., and of the Wyoming Flock Co., at Barberville, R. I., will be sold at auction Thursday, July 7, by the surviving partner, Charles L. Kenyon, to

clean up the affairs of a late copartnership.

E. D. Ward, of Worcester, is the contractor in charge of the erection of a new electric power station for the Hamilton Woolen Co., in Globe Village, near Southbridge, Mass. A 175-foot chimney will be built.

The Pond Lily Co., of New Haven, manufacturer of bleached cotton goods, will install new machinery in an addition to its plant that will add about 18,000 square feet to its present floor capacity.

Weaving machinery operated by electricity generated by the company will be installed in the new weave shed of the Charlton Mills, of Fall River, work upon which is now under way. Work is being pushed so as to equip the mill as soon as possible.

The power house of the Royal Worcester Corset Co., Worcester, Mass., is to be enlarged at a cost of $10,000 and additional equipment installed.

Metropolitan water and sewerage board, 1 Ashburton place, Boston, are advertising in part for bids on 2,631 feet of 18 and 12-inch pipes for an addition to the sewerage system. Bids will be closed July 22.

The International Mfg. Co. is to erect large toothpick mills at Phillips, Me., to include a three-story building 144 by 58 feet, also a power house in which will be installed a 250-horsepower automatic engine. O. H. Hersey will superintend the erection of the plant.

The Southbridge Water Co., of Southbridge, Mass., will extend its water mains this summer at an estimated cost of $16,000. The improvements include the laying of 5,800 feet of 12-inch service pipe.

The United States Paper Bottle Co. has acquired a site in Hartford, Conn., and will build a plant there in the near future.

The plant of the New Haven Iron & Steel Co. has been closed and general manager Schall says he does not know yet whether it will be reopened.

CINCINNATI.

Dealers Satisfied With Conditions Although Trade is Somewhat Spotted.

Office of THE IRON TRADE REVIEW, Room 11, Blymyer Bldg., July 5.

The month of June taken as a whole has in some respects proven quite satisfactory to builders of machine tools. Reports are somewhat conflicting as to the exact condition of this market. A number of machine shops have been working on contract orders which have enabled them to maintain a fairly normal capacity. In addition to this, new work has come forward in such volume as to about maintain the equilibrium, and thereby gradually extend the time of deliveries. Manufacturers feel that all that is needed is a settlement of the legislative questions which will bring about renewed confidence and cause railroads and other large interests to invest heavily in new equipment of all kinds. The demand in machine tools appears to be largely along the line of small lathes, screw machines, gear cutters, milling machines, with other standard tools less active. There are reports current, that several of the shops have reduced their forces by dispensing with the extra shifts, while still others are not discharging men but are not replacing those who for any reason may desire to leave. Local foundries are comparatively quiet and new work is not pressing to any extent except at intervals.

The John Steptoe Shaper Co. is only moderately busy, demand having shown some decrease during the past two weeks. Some few machines have been sent to Australia, which represents practically the foreign trade at this time.

The United States Frog & Switch Co., whose plant is at Oakley, O., is running to normal capacity, and is turning out orders averaging $15,000 per month, has unfilled contracts amounting to as much more on the books, and the situation is regarded as very satisfactory.

The United States Motor Truck Co. has tentative orders for about 150 machines which will be taken care of as rapidly as possible. A large gas engine plant, radial drill, milling machine and lathe have recently been installed.

The G. A. Gray Co. reports a general and increasing demand for its tools, particularly the larger sizes. The equipment that has recently been added enables them to handle the output more satisfactorily.

The new plant of the Cincinnati-Bickford Tool Co., at Oakley, is being hurried forward. The structural work has about all been placed and the brick work has been started. It is anticipated that the plant will be ready for business about Nov. 1.

Geo. Doods & Sons, Xenia, O., have had plans prepared for a large addition to their marble manufacturing plant.

WASHINGTON.

Government Lists Feature of the Week —General Machinery Market Quiet.

Office of THE IRON TRADE REVIEW, Post Building, July 5.

The publication of specifications for the electrical equipment for the navy yard at Charleston, S. C., forms the feature of the week in Washington machinery circles. The Isthmian canal commission published a small list and the army department asked for bids on the erection of several buildings. Sales of condemned naval supplies are advertised to be held at three of the navy yards.

In general machinery circles nothing of note was reported and the week was noticeably devoid of interest.

The supervising architect of the treasury department, Washington, D. C., will receive bids until Aug. 3, for the construction complete, including plumbing, gas piping, heating apparatus, electric conduits and wiring, for the United States postoffice at Litchfield, Ill., and until Aug. 4, for the construction complete, including plumbing, gas piping, heating apparatus, electric conduits and wiring of the United States postoffice at Chelsea, Mass.

He will also receive bids until Aug. 10, for the construction complete, including plumbing, gas piping, heating apparatus, electric conduits and wiring of the United States postoffice at Decorah, Ia., and until Aug. 8, for the construction complete, including plumbing, gas piping, heating apparatus, electric conduits and wiring for the United States postoffice at Amsterdam, N. Y.

R. C. Hollyday, chief of the bureau of yards and docks, navy department, Washington, will receive bids until July 16, for two 100-kilowatt synchronous generator sets, one motor booster set and eight-panel switchboard, instruments, wiring and accessories, installed and connected up in working order upon foundations furnished by the government, in the water front sub-station at the navy yard, Charleston, S. C. Each motor generator set shall consist of one synchronous motor of at least 125 k. v. a. capacity, direct-connected to and on a common cast iron bed plate with two 50-kilowatt, 125-volt direct current generators, the latter being designed for a variable voltage. The booster set shall consist of an induction motor of at least 5-horsepower capacity, direct-connected to and on a common cast iron bed plate with a 2½-kilowatt, five-volt direct current generator, the latter being designed for a variable voltage. The switchboard shall consist of eight panels and shall be designed to control the telephone apparatus.

The commissioner of fisheries, department of commerce and labor, Washington, D. C., will receive bids until July 26, for the construction of a boiler and pump house for the biological station on the government reserve at Fairport, Ia.

Capt. F. C. Boggs, general purchasing agent of the Isthmian canal commission, will receive bids under canal circular 593 until July 19, for the following supplies: Manganese tumblers and rollers, bushings, lag and set screws, engine indicators, steam traps, hose couplings, flanges, repair valves and other miscellaneous supplies.

There will be sold at the navy yard, New York, material belonging to the navy, condemned as unfit for use therein, as follows: Safes, hose, packing, machine tools, hand tools, blocks, engines, pumps, boilers, electric fans and other miscellaneous stores. The sale will be for cash to the highest bidder by sealed proposals to be opened July 18. Schedules can be obtained from Beekman Winthrop, assistant secretary of the navy, or the board of sale, navy yard, New York.

There will also be sold at the naval training station, Newport, R. I., a quantity of scrap iron, etc., and other naval supplies condemned as unfit for use in the navy. Sealed proposals will be opened at 2:30 p. m., July 20, and schedules can be obtained from the general storekeeper, naval training station, Newport, R. I., or Beekman Winthrop, assistant secretary of the navy.

There will be sold at the navy yard, Philadelphia, Pa., material condemned by the navy as unfit for use therein, consisting of boilers, engines, pumps, hose, anchors, scrap iron and a variety of other miscellaneous stores and supplies. Bids will be opened July 26.

Schedules can be obtained from the general storekeeper, navy yard, Philadelphia, Pa., or from Beekman Winthrop, assistant secretary of the navy.

Bids will be received by Thomas Cruse, quartermaster general of the United States army, at the office of the chief quartermaster, Federal building, Chicago, until July 12, for the supplying of 400 refrigerators of various sizes.

Bids will be received by Capt. Ernst R. Tilton, constructing quartermaster, Ft. Monroe, Va., until July 18, for the construction of an addition to the post hospital at Ft. Monroe, Va., including plumbing, heating and electric wiring and fixtures. Twenty-five dollars deposit required on plans.

A new heating plant will be installed in the junior officers' quarters of the marine barracks, navy yard, New York, at a cost of about $5,000. Plans and specifications are now being prepared and bids will shortly be asked for by the quartermaster of the marine corps.

NEW ORLEANS

Business Generally Quiet in the South —Developments in Oil Fields Cause Good Demand.

July 5.

Three kinds of machinery are in much demand at present. Oil rigs and drills; dredges for reclaiming swamp lands with pumps, ditching machinery and specially constructed plows and mining apparatus. The first two classes are needed for the development of properties in Louisiana and Mississippi, which are showing promising indications of becoming oil bearing or productive of good revenues as farm lands. The third class is for the recently boomed mining districts of Nicaragua, and offer an opportunity which New Orleans merchants, it is claimed, are not as alive to as are some of those in the interior. This arises from the entrance into the field of the Bradley-McKinsey syndicate, which is a large operator in Goldfield, Nev., and throughout the southwest, as well as the Guggenheim Exploration Co., both of whom plan extensive improvements to properties recently acquired.

Many inquiries are being received locally for bids on oil drilling machinery and supplies. A substantial boom in these lines has been started in southern Louisiana and Mississippi. Many companies are being formed for exploration purposes and there is prospect of a flourishing business in such machinery as appertains to the craft. The Mississippi Valley Oil & Gas Co., of St. Louis, which a year ago secured a franchise from New Orleans to supply the city with fuel and illuminating natural gas from the Caddo parish field, near Shreveport, will soon be in the market for pipe line supplies. A pipe line of more than 375 miles will have to be laid from Shreveport to New Orleans, and the company also expects to considerably extend the underground gas-pipe system of this city. The expenditure will exceed $15,000,000.

In Mississippi several small companies have been started near Gulfport and Biloxi, and one at Kosciusko, known as the Home Oil & Gas Co. This company will exploit lands in Attala county, and has a paid-up capital of $5,000.

In the drainage and dredging machinery line, bids are being prepared by the New Orleans Lake Shore Land Co. for a 500-horsepower pumping plant suitable for drainage of about 6,000 acres. It will cost about $45,000. The company has $250,000 to expend on reclamation of a strip about 1 mile wide and 7 miles long during the first year. The Louisiana Meadows Co. also has some projects for land reclamation which makes it a prospective buyer.

The Great Southern Lumber Co., whose plant at Bogalusa sustained the loss of a big planing mill some weeks ago, will issue specifications for a large order of belting of all kinds and sizes this week.

A $200,000 sugar refinery will be erected soon at Carencro, a little town near Lafayette, La. Initial steps towards the organization of the company were taken last week at a meeting of planters from Broussard, Youngville and Carencro with C. J. Bennett, representative of the interests controlling the Hamilton-Brown Co., of St. Louis. A charter will be issued within two weeks and specifications for the refinery and machinery will be drawn up.

The Texas company which recently acquired holdings in the oil field near Shreveport is making preparations to erect 50 tanks with a capacity of 37,000 barrels each, on Grigsby Island. A refinery for oil will also be erected, the entire investment to be $500,000. The capacity of the refinery will be 30,000 gallons per day.

BALTIMORE.

Machinery Lines Rather Dull Except for Specialties—Increase in Demand for Automobile Tools.

July 5.

The general machinery business has been rather dull for the past week, but there is a briskness along certain specialty lines. Considerable estimating is being done in general lines, however, and the outlook for the future might be far worse than at present. There is considerable building activity just now and the caring for the mechanical end of these structures will cause a healthy tone.

There has been more automobile buying here this summer than in the history of the city, and there is a very brisk demand for auto tools of all kinds. The automobile trade in Maryland has always been restricted by the miserable nature of the public roads in and near the city, but the state is now carrying out a general good roads plan and spending $5,000,000, with other large expenditures in prospect, and the auto-owning fever has spread more rapidly than has been the case in the past.

The structural plants about Baltimore are all working full time and report a healthy line of inquiries. Handlers of bridging material are especially busy just at present.

The Southern Can Co. has decided to build a large brick and concrete warehouse and lithographing building, to cost $41,500.

The Baltimore Copper Smelting & Rolling Co. has purchased two tracts of land on which it will erect a large addition to its plant in the near future.

The Baltimore Fidelity Warehouse Co. is to add four more stories to its warehouse at a cost of $70,000. Emory and Nussear are the architects and the Armored Concrete Construction Co. the builder.

There was only one bidder for the high-pressure pumping station to be built here in connection with the pipe line of the fire department, although seven firms took drawings and specifications. B. F. Bennett bid $127,000 and will probably get the contract. On a former bid he was lowest of several at $150,106, but the city was not willing to pay that much and the bids were asked again with modifications to the plans.

The Excellent Laundry Co., of Baltimore city, has been incorporated by William N. Slack, Louis Armstrong and Gordon W. Bonnette, and will shortly be in the market for machinery.

It is understood that Richard B. Fentress, of Norfolk, Va., is planning the organization of a company to build an electric plant for furnishing light, heat and power in the city of Baltimore. He is represented in Baltimore by Carrington & Carrington, Maryland Telephone building.

The plant to be erected by the Falconer Mfg. Co., manufacturer of banking stationery, will consist of a building 70 x 125 feet, five stories, of steel, concrete and brick construction. It will require elevators, steam heating plant, electric light and power plant, roof tank for 15,000 to 20,000 gallons of water and a number of electric motors, as each machine will be driven by direct-connected motor. The construction is under the supervision of Parker, Thomas & Rice, 1109 Union Trust building, with Charles L. Reeder, Equitable building, as consulting engineer.

The eight-story steel and concrete building to be erected by Hochschild, Kohn & Co., at Howard and Lexington streets, will require the installation of a vacuum system of heating, electric lighting plant and hydraulic elevators. Henry Adams, 805 Calvert building, is consulting engineer.

Otto G. Simonson, 1210 American building, Baltimore, is preparing plans for a two-story factory building to be erected at Hagerstown, Md., for the Jones Cold Storage Door Co. The building will contain machine, finishing, assembling, iron working and galvanizing departments. Woodworking machinery and an electric power plant will be installed.

A steam laundry will be established at Lagrange, Ga., by the Lagrange Ice & Fuel Co., which will utilize waste steam and water from the ice plant.

MISCELLANEOUS MACHINERY.

The board of water commissioners of Livonia, N. Y., will shortly receive bids for the construction of a pumping plant and its connection with existing mains. The equipment will consist of a triplex pump with connecting motor and triplex pump with connecting gasoline engine, and the work to be done consists of the laying of approximately 400 feet of 6-inch pipe and the castings and gates appertaining thereto. C. H. Cary is clerk and N. A. Brown, of Rochester, N. Y., is the engineer.

Bids will be received until July 15 by the city of Oxford, Miss., for drilling wells and installing machinery to equip two water systems, to increase the capacity of the plant to 500,000 gallons daily. W. L. Smith is deputy city clerk.

Bids will be received, Aug. 1, for the construction of a water works, electric light plant and sewerage system for the city of Sylvania, Ga. A. B. Lovett is mayor.

The Coast Fishing Corporation, of Reedville, Va., wants prices on three Scotch boilers, 150 horsepower, 100 pounds working pressure.

Bids will be received by J. H. Clark, city clerk of Indianola, Ia., until 7 p. m., July 12, for furnishing 10,000 feet of standard 4-inch cast iron pipe, 50 Eddy hydrants and 17 Eddy gates; also for the construction and material necessary for the water works. A H. Gilliland is engineer.

The Charter Oak Stove & Range Co., St. Louis, Mo., will spend $140,000 in the erection of buildings, comprising molding shop, mounting shop, pattern room, boiler room, engine room, warehouse, etc. These buildings will have a total length of 578 feet and a width of 313 feet. One hundred thousand dollars will be spent on the installation of machinery.

More than $5,000,000 will be spent by the Bay Cities Water Companies, Oakland, Cal., in installing distributing systems in Oakland, Berkeley, Alameda and Piedmont, Cal. C. L. Gilman is engineer.

The city of Kirkwood, Ga., contemplates voting a bond issue of $60,000, the proceeds of which are to be used for the installation of a water works system.

Eleven miles of mains are to be installed in connection with the water works system by the city of Conway, Ark., at a cost of $75,000.

The citizens of Canton, Kan., have voted $30,000 for the construction of an electric light system and water works.

A plant for the manufacture of wire fencing will be erected at Osage, Okla. The Osage Land & Development Co., Oklahoma City, is interested.

A slaughter house and refrigerator plant will be erected at Memphis, Tenn., by M. F. Raines.

The addresses of manufacturers of angle and sheet irons are wanted by Z. J. Carter & Son, Wallace, N. C.

John G. Duncan Co., Knoxville, Tenn., is in the market for a second-hand 125-horsepower return tubular boiler, 100 to 125 pounds working pressure.

R. K. Papin & Co., St. Louis, Mo., want a standard gage four or eight-wheel locomotive crane with 50-foot boom and with a fall block and hook; also a four or eight-wheel standard gage crane 35 to 40-foot boom with one-yard clamshell bucket.

The Conrad-Bering Lumber Co., Houston, Tex., is in the market for a boiler with smoke stack and necessary breeching to connect with five boilers for the plant at Pawnee, La.

The Ellington Building Supply Co., of Raleigh, N. C., is in the market for an 80 to 100-horsepower return tubular boiler complete.

The Citizens Committee, of Gordon, Ga., is in the market for pumps and boilers.

C. F. Berrard, mayor of Lauraville, La., will receive bids on a 5,000-gallon tower tank with 75-foot tower.

The Hollingsworth Wheel Co., Hagerstown, Md., is in the market for factory trucks.

The West India Electric Co., of Kingston, Jamaica, is planning to reconstruct and considerably enlarge its hydro-electric power plant near Kingston, Jamaica.

Two new boilers of about 350 horsepower are to be shortly installed in the plant of the Peabody Electric Light Co., at Peabody, Mass.

A large hydro-electric power plant which will be erected on the Grand river, about 25 miles from Muskogee, Okla., is being planned by the Muskogee Gas & Electric Co.

J. O. Fries, Orlando, Fla., is the engineer for the contemplated water works to be constructed by the city at a cost of $100,000.

The citizens of San Diego, Cal., will shortly vote on the issuance of $1,000,000 worth of bonds to be applied to the purchase or construction of a municipal light and power plant for the city.

An addition to the South Alameda street power house of the Los Angeles Gas & Electric Co., to cost $12,000, will shortly be made.

The plant of the Boyne Pump Works, Ashland, Pa., is to be enlarged and considerable equipment added.

An additional power station will be erected this summer by the Dakota Power Co., of Rapid City, S. D.

A $15,000 foundry and machine shop will be erected in Columbia, Miss., by C. B. Rice, of Garyville, La., on a lot which he recently purchased from the Columbia Commercial Club.

The Rockwell Mfg. Co., of Westchester, Pa., is building a plant for the manufacture of gas engines.

The Monarch Mfg. Co., manufacturer of axle grease and lubricating oils, Ironville, O., will erect a new plant.

The citizens of Davenport, Ia., are raising $200,000 towards building an interurban line between Davenport, Iowa City, Grinnell, Des Moines and Atlantic. A. P. Chamberlain and G. W. Ryan, of Des Moines, are interested.

The Peoples' Railway Co., of Berlin, O., will receive bids until July 15 for clearing and grading 29 miles of its proposed railway and for the construction of five bridge piers and one 400-foot bridge; also for a quantity of ties, 70-pound T-rails, spikes, bolts, rail bonds, grooved trolley wire, trolley messenger wire, 50 miles of fence wire, gates and fence posts. A. N. Warfield, Berlin, O., is general manager.

The citizens of Ansley, Neb., have voted to issue $12,000 worth of bonds for the erection of an electric light plant and extensions to the water system.

The board of water commissioners, Atlantic City, N. J., will receive bids until 2:30 p. m., July 15, for furnishing and installing steam and water pipes, valves and fittings at Absecon pumping station. Bids must be accompanied by deposit of $1,000. L. Van Gilder is engineer and superintendent.

The lighting committee of Bedford City, Va., will receive bids until noon, July 13, for furnishing of material and machinery for the construction of a hydro-electric plant on the James river, near Big Island; also for the construction of a transmission line about 25 miles to Bedford City, Va.; also for furnishing and installing equipment for the sub-station. Plans can be seen at the mayor's office, Bedford City, or at the office of the engineer, F. R. Weller, Washington, D. C.

The Imboden, Ark., electric light and water plant has been purchased from the People's Bank by Mrs. Jennie Nash, of Jonesville, Ark. She will make improvements and additions to it.

The Richwood Gin Co., of England, Ark., has increased its capital stock from $10,000 to $20,000 for the purpose of constructing an electric light plant and water works.

The city of Nacogdoches, Tex., is considering the construction of an electric light plant and a committee is now investigating the matter.

The city of Staunton, Va., has awarded a contract to the Staunton Lighting Co. to furnish the town with light. The company will install new machinery at its power plant and also auxiliary machinery in the present municipal plant.

The citizens of Aliceville, Ala., are considering the construction of a municipal electric light plant.

The Cambria Steel Co. has placed an order with the American Ship Windlass Co., Providence, R. I., for three seven-retort Taylor stokers.

A plant for the manufacture of Balata belting, to cost in the neighborhood of $500,000 for building and equipment, will be located at Easton, Pa., by a combination of interests. The company will be known as the Victor Balata & Textile Belting Co., and is a combine of German interests represented by Wm. Vollrath, Albert Vollrath and Edwin Vollrath, of Blankenburg, Germany, the largest manufacturers of textile belting in Europe, and Chas. E. Aaron and John R. Stein, of the New York Leather Belting Co. Work on the new plant is to be begun at once.

New machinery is to be installed in the municipal waterworks at St. Augustine, Fla.

AMERICAN SOCIETY FOR TESTING MATERIALS

DOES GREAT WORK ON STANDARD CAST IRON SPECIFICATIONS.

Tribute is Paid to Dr. Dudley in Memorial Addresses by Former Associates — Coatings for Iron and Steel an Important Subject of Discussion.

No better evidence of the work accomplished by the American Society for Testing Materials, since its organization, could be offered, than was contained in the reports of the Committees on Standard Specifications for Cast Iron and Finished Castings, and on Standard Specifications for Steel, presented at the thirteenth annual meeting of this organization, held at Atlantic City, June 28 to July 2. These reports directed attention to the favorable prospects for the adoption of uniform specifications for pig iron, cast iron, cast iron pipe, steel products and the arbitration test bar, by England, Germany and the United States; and it is probable that the unification of specifications in these countries will have been accomplished before the next Congress of the International Society for Testing Materials, which will be held in this country in 1912. The fairness of the American specifications is being more generally recognized abroad, by manufacturers and consumers alike, and the purchase and sale of pig iron by analysis, instead of by fracture, is at last being favorably considered in England. The cement specifications adopted by the Society have received wide recognition, and more than 50,000 copies of this standard have been sent to users and producers all over the world.

That copper in steel, in low percentages, improves its physical properties, rather than produces the opposite effect as generally believed, was brought out in the discussion of G. H. Clamer's paper on "Cupro-Nickel Steel." Tests of steel containing copper, made in an electric furnace, gave high tensile results. This is an important development which may lead to the removal of the prejudice against steel-making pig iron containing copper, and its effect promises to be far-reaching, especially in the east, where a large tonnage of iron, made from Cornwall ores, containing copper, is used. One Pennsylvania steel manufacturer is experimenting with a mixture of Cornwall ore containing copper, and Cuban ore containing nickel and chromium, but no report of the results will be available for some time. The discussion of tests of metals for hardness may lead to an investigation into all of the methods now in use as well as the adoption of a universal system of expressing hardness. The registration for the week, which was well above 300, exceeded all previous attendance records.

Cast Iron.

Reports of various committees were presented at the opening session, Tuesday afternoon. The report of committee A-3, on Standard Specification for Cast Iron and Finished Castings, related principally to the action taken regarding cast iron at the Copenhagen Congress of the International Society for Testing Materials. For the purpose of defining more accurately the quality of pig iron than is possible by the present method of grading by fracture, a sub-committee was instructed at this Congress to inquire in the various countries concerned, as to how far specifications by analysis may be usefully substituted for the present method of grading by fracture. Since this meeting, discussions have been held in England regarding the advisability of bringing their practice into line with that proposed by the above resolution, while in Germany and America the buying and selling of pig iron by analysis is now generally recognized and adopted.

Arbitration Test Bars.

In view of the differences in the lengths of test bars cast separately to ascertain the quality of the metal going into iron castings it was recommended at the Congress that each country interested make a series of tests with bars approximately 1¼ inches in diameter, cast under standard condition, in lengths varying from 6 to 24 inches between supports. A set of ten bars each for three classes of gray iron, containing 1.50, 2.00 and 2.50 per cent of silicon respectively, was recommended, the bars being cast 26 inches long and cut up for test purposes.

In accordance with this resolution, a series of tests were conducted in this country by C. D. Mathews, and his report is in part as follows:

The test bars, 1¼ inches in diameter and 26 inches long, were cast separately on end in dry-sand molds. Nine sets of bars were taken from different melts to represent the three grades or classes of ordinary iron, viz., silicon 1.50, 2.00 and 2.50 per cent. To insure uniformity, the iron representing each set was first taken from the cupola in a four-ton ladle, and from this ladle three hand-ladles taken to pour each set.

From each set three transverse tests were made on supports 12, 18 and 24 inches apart. A variation in diameter of bars from 1.23 to 1.25 inches was noted and the values corrected for a diameter of 1.25 inches. No correction was made for deflection. Three tensile tests were made from each set for comparison, the test pieces being taken from broken sections of bars from the transverse test, turned to 0.80 inches diameter, and ends threaded for grips. A number of analyses were made in order to determine if any variation in strength was caused by, or could be attributed to, any difference in composition.

Considerable variation in strength was found, even in iron from the same ladle, though the average results were quite uniform in relative proportion to the span and the tensile strength.

In making a comparison of the results, it was deemed best to consider the strength, as shown by the modulus of rupture. This should theoretically be the same for the same iron, irrespective of the length of span. As a matter of fact, however, it is not. A comparison of the moduli of rupture of the various bars follows:

Moduli of Rupture.

POUNDS PER SQUARE INCH.

Silicon, per cent.	Span. 12 inches.	18 inches.	24 inches.	Remarks.
1.50	47,100	45,600	44,700	Average of nine bars.
2.00	45,500	43,200	39,700	Average of nine bars.
2.50	45,200	44,900	44,000	Average of nine bars.
1.50	43,300	40,700	39,700	Lowest of nine bars.
2.00	41,200	39,100	37,100	Lowest of nine bars.
2.50	42,300	39,700	36,300	Lowest of nine bars.
1.50	54,600	49,900	48,400	Highest of nine bars.
2.00	51,600	46,500	42,700	Highest of nine bars.
2.50	48,100	52,400	49,200	Highest of nine bars.

From the above it will be noted that while the average results are fairly uniform, the highest average is shown on the 12-inch span and the lowest on the 24-inch span, for each of the three grades of iron. Taking the extreme variation, it is seen that the highest values were obtained on the 12-inch span

for 1.50 and 2.00 per cent silicon, and on the 18-inch span for 2.50 per cent silicon; the lowest results were all obtained on the 24-inch span.

This would seem to indicate that a 12-inch bar is too stiff, and a 24-inch bar too weak, for satisfactory or uniform results. The conclusions would, therefore, be that the length of span best suited for testing the 1¼-inch bar is somewhere between 12 and 24 inches.

With the idea of possibly determining this point, an additional set of forty bars, 1¼ inches in diameter and 26 inches long, as before, were cast from the same mixture of 2.00 per cent silicon iron, ten bars each being tested on supports 14, 16, 18 and 20 inches apart.

A summary of these results by comparing the moduli of rupture is given below:

Moduli of Rupture.

POUNDS PER SQUARE INCH.

	Span.			
	14 inches.	16 inches.	18 inches.	20 inches.
Average	44,000	43,800	43,800	44,100
Low	42,000	41,500	41,200	41,000
High	46,100	45,100	48,500	48,700

These results are quite uniform and would seem to leave it optional which should be considered the length of span best suited. Judging from the writer's experience, it is probable that 16 or 18 inches would prove equally satisfactory, and either preferable to a greater or less distance.

As the tensile tests were all made on pieces of the same section, cast under the same condition, they offer a reliable means of comparison with the transverse strength at different spans. The results show the following approximate relationship:

Tensile strength	=	8.5	times	transverse strength at 12 inches.
Tensile strength	=	13	times	transverse strength at 18 inches.
Tensile strength	=	18	times	transverse strength at 24 inches.

Variations of about 5 per cent in tensile strength and at least 10 per cent transverse strength are to expected.

German Practice.

In discussing German practice, Dr. Richard Moldenke said that at one time the test bars cast were 1 meter long, and three sets of bars were utilized, one for light, one for medium and one for heavy castings. Now only one test bar is used in Germany and this is 24 inches long. He added that it was decided at the Copenhagen Congress that all countries make tests to obtain a uniform length, and it now appears that this will be from 16 to 18 inches. Walter Wood, in commenting upon the work of the American Society for Testing Materials, called attention to the first discussion of the arbitration test bar, some seven or eight years ago, and as a result of subsequent investigation, there promises to be a unification of this practice among the leading countries of the world.

Cast Iron Pipe.

There is already a close approximation of existing specifications for cast iron pipe in the various countries interested, but steps are now being taken to make these uniform. The English engineers and manufacturers are at present discussing the problems of cast iron specifications on the basis of those adopted by the respective testing societies in Germany and America. The American specifications have been generally adopted by various technical societies in this country as well as the American Water Works Association. The work of standardizing cast iron specifications is progressing so favorably that it is probable that uniform specifications adopted by England, Germany and the United States can be reported to the next International Congress in this country in 1912.

With the exception of proposed changes on specifications for locomotive cylinders, no changes were recommended in existing specifications. The committee on locomotive cylinders is considering minor changes, but was not ready to report.

Specifications for Staybolt Iron.

Proposed standard specifications for staybolt iron, previously presented to the society, but referred back to the committee for further changes, were presented for adoption. These will be passed upon by letter ballot and are as follows:

Process of Manufacture.

All staybolt iron must be hammered or rolled from a bloom or a box-pile having a cross-sectional area of at least 45 square inches, and not less than 18 inches long, the basis of which must be pig metal and entirely free from any admixture of steel.

Physical Tests.

(a) **Tensile Strength.**—Not less than 48,000 pounds per square inch.

(b) **Elongation.**—Not less than 28 per cent in 8 inches.

(c) **Reduction of Area.**—Not less than 45 per cent.

(d) **Double Bending Test.**—Close in both directions without flaws.

(e) **Nick and Break Test.**—A bar, nicked all around to a depth not less than 8 per cent and not more than 16 per cent of the diameter of the bar, and broken, shall show a clean fiber entirely free from crystallization.

(f) **Vibration Test.**—The test bar shall stand a minimum of 6,000 revolutions when subjected to the following vibratory test:

A threaded specimen, fixed at one end, has the other end moved in a circular path while stressed with a tensile load of 4,000 pounds. The circle described shall have a radius of 3/32 inch at a point 8 inches from the fixed end of the specimen.

Inspection.

(a) The iron must be smoothly rolled and free from slivers, depressions, seams, crop ends and evidences of being burnt.

(b) It must be truly round within 0.01 inch and must not be more than 0.005 inch above, or more than 0.01 inch below specified sizes.

Selection of Samples for Test.

The bars will be sorted into lots of 100 bars each and two bars will be selected at random from each pile. Failure of either of these bars to meet any of the above specifications will be cause for rejection of the lot which the tests represent.

Tests of Cast Iron.

Alexander E. Outerbridge Jr., Philadelphia, presented a report on recent tests of cast iron which dealt with the effect of the rate of cooling of cast iron in test bars, varying but slightly in dimensions. From the same ladle, two test bars were cast, each 15 inches long, and 1 inch and ¾ inch square respectively. The object of making two sizes of test bars varying only ¼ inch in lateral dimensions, was to approximate as closely as possible the cooling conditions existing in large castings poured from the same heat and which varied in thickness.

Physical tests of these bars showed a pronounced uniformity of tensile strength of different bars of the same dimensions, cast from one ladle of iron. The smaller bars, ¾ inch square, invariably showed higher tensile strength than the 1-inch bars, cast from the same ladles, corroborating observations made by Mr. Outerbridge in 1903. The minimum increase in the average tensile strength of the small bars over the large bars, cast from the same ladle and turned to the same diameter, was 2,250 pounds per square inch, and the maximum increase was 7,500 pounds per square inch.

Mr. Outerbridge drew the following conclusions from these tests: "It is certainly remarkable that differences so large should occur between bars differing so little in dimensions, cast from one ladle, and presumably of uniform mixture of iron. It shows how very sensitive the metal is to cooling influences, and again reveals the importance of adopting standard sizes of bars for tests of cast iron."

Unevenly Chilled Car Wheels.

A paper on "Unevenly Chilled and Untrue Car Wheels," by Thomas D. West, was presented, which is briefly as follows:

An uneven depth of chill around car wheels is a serious evil. It weakens a wheel just as similar defects weaken chilled rolls, and wheels often snap in two under loads that would have had little effect on them were they chilled to an even depth. The chief cause of this weakness lies in the great difference in strength and contraction of the same iron when in a gray state and in the chilled form.

First, as to the question of strength. Of two casts from the same ladle, the one gray and the other chilled or of an all-white fracture, which means that the carbon is almost entirely in the combined form, the latter generally possesses but little over half the strength of

the former. The strength of the white or chilled iron varies according to the class of iron used, that coming from a burnt or oxidized iron being the weakest and that from charcoal iron the strongest. As far as the strength is concerned, therefore, compelling the iron to take the white or chilled form is a necessary evil and often a serious one, especially if the depth of chill is uneven, as it is in the great majority of car wheels cast today.

Secondly, in considering the relative contraction of chilled and gray iron cast from the same ladle of metal, we find that the former contracts about as much again as the latter.

Recognizing the importance of tests on the roundness of tread of chilled car wheels, Mr. West succeeded in obtaining data upon such tests through the courtesies of S. K. Dickerson, assistant superintendent of motive power, and H. E. Smith, engineer of tests, of the Lake Shore & Michigan Southern Railway Co.

To make these tests six pairs of wheels, cast by different founders, were selected. An axle with a wheel pressed on each end was placed in a lathe, and the centers were firmly pressed. The wheels were then hand-turned. The tread was divided into eight sections, each the same distance from the flat edge, and a specially constructed micrometer used to discover any variation in the roundness. All the testing was done with great care and precision. The tests demonstrated the irregularity in the roundness of the chilled car wheels, some of them being out of true as much as 0.043 inch.

The results of a majority of these tests certainly demonstrate the necessity of improvement in the roundness of wheels as well as obtaining an even depth of chill, and show the importance of testing the roundness of car wheels. Mr. West is not aware of any regular tests of this kind being made by the railroads, but believes that if they were made with the present make of wheels, only a very small percentage would pass satisfactorily. Such tests could readily and cheaply be made before the wheels are bored by setting an internally-turned iron ring over the tread. There are, of course, other plans which could be used, but the ring should answer the purpose in many cases.

While the wheels are undoubtedly weakened by the uneven depth of chill and have, therefore, a shorter life, their lack of roundness also prevents smooth running and must cause some vibration or pounding which greatly aids in creating fractures or breaks in the rails. This pounding effect of flat wheels has been accurately and scientifically demonstrated.

Another fact which was brought out in the experiments, and one which is known or fully realized by very few if any experienced car wheel makers, is that the chiller will expand about ¼ inch in diameter after pouring the metal. Here is a movement which is the opposite of contraction and which, in the case of the compression chiller, serves to pull the arms back from the contracting crust more than their expansion can force them inward. This evidently defeats the purpose of having arms tightly hug the contracting crust, which is necessary to obtain an even depth of chill and true roundness in wheels.

Report of Executive Committee.

A change in the permanent organization of committees recommended by the executive committee provoked considerable discussion. It was suggested that a chairman be elected from among the representatives of consuming interests and unattached experts by a majority vote of those present, or from among the representatives of manufacturing interests by a three-fourths vote of those present. It has been the custom to elect the chairman of these committees from among the representatives of the consuming interests or unattached experts, and with the exception of only two committees, organized some years ago, this custom has prevailed.

W. A. Bostwick, Carnegie Steel Co., was opposed to the recommendation on the ground that it was in violation of one of the traditions of the society that the chairman must be a representative of consuming interests or an unattached expert. Several members were of the opinion that manufacturers' representatives should be eligible to the office of chairman, as both manufacturers and consumers meet on common ground at the meeting of the society. A vote of the members in attendance showed a large majority opposed to the resolution, and it will be referred to the members for final action by letter ballot. That the members be fully advised regarding the proposed change, arguments for and against the resolution will accompany the ballot, as well as a result of the vote of the members in attendance at the meeting.

The report of the committee on Standard Methods of Testing was favorably acted upon and will be referred to the members for letter ballot. No report was made by the committee on Standard Specifications for Hand-Drawn Copper Wire.

Tuesday Evening.

On taking the chair Tuesday evening, Prof. H. M. Howe was presented to the society by Vice President Lesley as its president-elect and was warmly greeted. After briefiy acknowledging the honor, Prof. Howe presented a report on further tests on the "Closing of Blow-Holes in Steel Ingots." Last year he briefly outlined experiments which he had conducted on a steel ingot intended for boiler plate. Pieces extending from front to back were cut out of the side of this ingot, one at the top, one at the middle, and a third near the bottom. The ingot, which was subsequently rolled down into a plate, thus had three gaps extending in from one edge. Opposite these openings, sections were cut out and their specific gravity compared with that of the steel previously cut out of the ingot. The specific gravity of the latter proved considerably less than that of the former, indicating a closing up of the blow-holes in rolling. Further investigation was made with a view of ascertaining the possible elongation of the blow-holes into seams. Thin slices were cut from the pieces of the plate opposite the third gaps, and these thin sections of steel were bent nearly double. In the event of the elongation of the blow-holes, it would be expected that seams as much as 3 inches in length would be found. Instead, the longest seam disclosed was 0.06 inch in length, while a number were but 0.02-inch in length.

Strength of Steel From I-Beams.

E. L. Hancock, professor of applied mechanics, Worcester Polytechnic Institute, reported upon tests of steel from standard beams made during the past year. The investigation of Prof. Edgar Marburg presented in 1909 before the society, showed considerable variation in the strength of the steel from the web, flange and root of the web. This investigation was confined principally to Bethlehem beams. The tests reported by Prof. Hancock were made on pieces cut from standard I-beams, varying in size from 6-inch, 13.5-pound to 20-inch, 65-pound, and on pieces cut from Bethlehem beams. Crop ends of standard beams were furnished by the Eastern Bridge & Structural Ca., Worcester, and the Bethlehem material was bought on the market. The test pieces were prepared and tested at the Worcester Polytechnic Institute.

The results of the tests showed that, generally, the material cut from the web had the highest elastic limit, while that cut from the root of the web had the lowest elastic limit, examination of the pieces cut from the web, flange and root, showed the web to have the finest structure, the flange next, while the root was much coarser. Practically all of the small beams showed a finer structure and the Bethlehem beams tested had a very fine structure and the fracture was silky.

The examination of the fractured pieces seemed to indicate rather conclusively that the work received by the metal in rolling renders the structure finer, and to this can probably be attributed the variation in strength. This view is further strengthened by the fact that the elastic limit for the thin or light beams is uniformly higher than for the thick or heavy beams. The same might also be said of the

ultimate strength. The yield point, while not given, was found to differ from the elastic limit much more in the Bethlehem beams than in the standard. The modulus of elasticity was very near 30,000,000 in each case. To show the variation in the strength of the material of one beam, three pieces were cut, one from a point near the root of the web, one from the extreme edge of the flange and one intermediate. The results of the tests were as follows, near the root, elastic limit, 24,000 pounds per square inch; intermediate, 34,000 pounds per square inch, and extreme, 36,000 pounds per square inch. This again showed the increase in the strength of the material resulting from greater working.

The results of this investigation were summarized as follows:

The elastic limit varies considerably for material cut from different portions of the beam, both standard and Bethlehem, being lowest in the root of the web, higher in the flange near the root, and highest in the web. This confirms the work of Prof. Marburg.

The indications are that there is considerable difference chemically in the material in different parts of the beam.

The appearance of the fractured pieces indicated a considerable variation in the density of the material throughout the beam, due probably to the work of rolling. The thin beams showed material superior to that of the thick beams.

Prof. Howe called attention to the results of the tests and in 8 out of 11 cases, the webs had a higher elastic limit than the flanges, and in no case did a flange have a higher elastic limit than the web. The fact that the web is finished colder than the root, he added, may be the explanation of the higher elastic limit of the web.

Tests of Beams.

H. F. Moore presented the results of a series of tests carried on at the University of Illinois which were made primarily to determine the twisting action and sidewise buckling of test beams of various lengths, and to determine the magnitude of the direct bending stresses which were developed in the beams at failure. The results, however, were not conclusive and further investigation will be made during the year. That there is considerable twisting action in beams under comparatively low loads was demonstrated.

Application of Load on Beams.

The ensuing discussion developed the fact that in testing heavy I-beams it is impossible to put on a static load, and repetitive loading which must be resorted to does not represent the load on the beam in actual service. In view of the many, almost conflicting reports of tests in beams, it was suggested that a large factor of safety be allowed by the engineers in the design of large structures.

Copper-Clad Steel.

"Copper-Clad Steel, its Metallurgy, Properties and Uses," was the subject of a paper read by Wirt Tassin, an abstract of which is presented herewith:

A process of welding copper to steel has been developed by the Duplex Metals Co., Chester, Pa., so that it will withstand the many methods used for working metals and will at the same time be a commercial product. The two metals are united in such a manner that the copper can only be separated from the steel by melting it off. The weld resists sudden and severe temperature changes. The copper-clad metal can be rolled, swaged or drawn, hot-worked or cold-worked, and the proportion of copper and steel existing in the original billet will remain nearly constant. In describing the method of working copper-clad steel, a billet suitable for making telephone wire was taken as an illustration. This is rolled to a 5/16-inch round, cut into 26-inch lengths, and both ends of each billet are drilled and tapped. After pickling and working, the billet is placed in a preheater and when the desired temperature is reached, it is drawn up into a tube by means of a rod and bushing screwed into the billet. A steel flange is screwed on the bottom of the billet, forming with the tube, a mold in which the billet is the core. The billet, with its attached flange, is lowered out of the tube into molten copper, where it is kept for a sufficient time to wet the surface of the steel and to form with it an alloy. The billet is then again drawn into the tube, carried to a second furnace of the pit type where the tube is lowered into a pot of molten copper which rushes into the mold and around the billet through two openings in the top of the tube.

The rolling is similar to that of steel, and notwithstanding the differences between the chemical and physical properties of copper and steel, the two metals, when welded by this process, flow practically as one. Tables of physical tests presented, showed that the tensile strength of copper-clad steel is not the mean of the strengths of the copper and the steel, but that it closely approximates that of steel. Tests on copper-clad rods have shown that when corrosion is set up it begins at the center of the steel instead of at the point of contact of the two metals, while with a copper tube shrunk on a steel rod, exactly the reverse is true. Copper-clad steel electrical wire has an average conductivity of 40 per cent of the same size copper wire. For mechanical purposes, where resistance to corrosion, combined with high tensile strength is essential, copper-clad steel is admirably adapted, since steel having any desired physical qualities may be used as the core.

Cost of Copper-Clad Steel.

In reply to a question relative to the cost of copper-clad steel, Mr. Tassin stated that it is slightly lower in price than copper and higher than all steel. Replying to further questions as to the structure of the material, Mr. Tassin said that at the point adjacent to the weld the steel is lower in carbon, and that certain changes in the structure of the steel occur which he is unable to explain. The steel, when clad with the copper, has a fine fibrous structure throughout which is carried through all the rollings. The modulus of elasticity of copper that precipitated considerable discussion. It was explained that the modulus of elasticity of copper-clad steel is the same as that of mild steel. However, in view of the fact that the modulus of elasticity of copper was stated to be subject to some doubt, Dr. Leonard Waldo presented a resolution providing for a committee of three to be appointed by the president, to report at the next general meeting of the society, on the proper use of the term "Modulus of Elasticity" (Young's Modulus) in engineering specifications and descriptions, including its use in describing nonferrous metallic materials and their compounds.

Wednesday Morning.

The report of the committee on standard specifications for steel, presented Wednesday morning, which was received and filed, contained a brief summary of the work of the Copenhagen Congress of the International Association for Testing Materials, prepared by the chairman, Wm. R. Webster. Special attention was directed to the progress made at this conference towards the ultimate establishment of international specifications for steel products. The move-

ments toward the unification of specifications inaugurated in various countries will undoubtedly lead to better and more reasonable standards and will eliminate certain hair-splitting requirements now met in every-day practice on export orders. Liberal support was asked to carry on this work.

Peculiar Failure of Rails.

M. H. Wickhorst presented a paper on "Low-Carbon Streaks in Open-Hearth Rails," which is briefly as follows:

During 1908 ond 1909, the Chicago, Burlington & Quincy Railroad Co. obtained some open-hearth rails which developed a peculiar kind of failure, the study of which proved very interesting. The nature of the failure caused considerable alarm at first, but the remedy was easily applied after the cause was determined. The failure consisted of the rails splitting through the head in various directions, through the web vertically or diagonally, vertically from the head to the base, and in other ways. As a part of the investigation, the rails were examined by cutting sections from the defective portions, polishing highly, and etching with picric acid solution in alcohol. The method of preparing, etching, and photographing the rail section was about as given in the following description of a method for etching rails.

Rail Etching.

A slice of the rail ¼ inch or more in thickness is cut with a cold saw or circular cutter, care being taken to get the cut surfaces as even as possible. Where available, probably the quickest and most satisfactory method is to use a circular saw. In case a machine-driven hack saw is used, it is best to have the saw frame in an inverted position, with the frame surrounding the rail, so that the weight of the frame may hang below the cutting blade, as this position is more apt to give a straight cut.

After the slice is obtained, one of the cut surfaces is filed or planed to a plane surface. The rail slice is then secured in any hand-clamp suitable for holding the section during the polishing operations. In polishing the rail sections, cast iron discs at least 12 inches in diameter are used. Emery cloth is attached to the face of the disc, preferably by means of a fairly light coat of rather soft asphalt. The rail section should first be ground with No. 1 emery cloth and then with No. 00. The section is then polished with tripoli and finally with rouge. These polishing powders are applied in a moist condition to a canvas-covered disc. When the surface is intended for further examination with the microscope and microphotographing a very high mirror polish is necessary and the surface must be free from even very minute scratches, such as show only under the microscope. When, however, it is intended only to examine for structural defects and streaks, so high a polish is not necessary.

The rail section is etched by holding it in a tray of 5 per cent solution of picric acid in alcohol. The etching generally requires from one to two minutes. When the rail section is taken from the acid, it is wiped with cotton saturated with alcohol. The picric acid does not color the ferrite or carbonless part of the steel structure; but the carbon-bearing part is colored somewhat in proportion to the content of carbon.

Photographing.

As the picric acid has no effect on the ferrite or carbon-free iron, streaks of low-carbon material are left with their full brightness, and in order to show these streaks properly, the light in photographing should be reflected perpendicularly from the specimen into the camera.

Some Typical Failures.

When etched as described, most of the split rails showed light streaks or patches, indicating streaks of metal low in carbon. Several of the rails had light areas big enough to allow getting samples for analysis, and the results obtained are as follows:

	Rail No. 1.		Rail No. 2.	
	Normal.	White band.	Normal.	White streak.
	Per ct.	Per ct.	Per ct.	Per ct.
Carbon	0.69	0.28	0.78	0.35
Phosphorus ..	0.037	0.091	0.036	0.073
Sulphur	0.034	0.048	0.030	.....
Manganese ..	0.94	0.64	0.85	.....
Silicon	0.15	0.09	....	0.15

Small white streaks examined under the microscope generally showed a nucleus of slag, indicating that the slag in some way causes a reduction in the amount of carbon. No. 2 also contained a large mass of non-metallic material contiguous to the white band; so it was at first thought that slag in the metal caused the white streaks possibly by oxidizing the carbon. This may perhaps be true of small streaks, but it was later learned that it was the practice at the mill that made these rails to put small soft Bessemer steel plates on the stools of the molds to reduce the cutting out of the stools by the hot metal. These plates, it seems, get churned up with the rest of the metal, melt partly or wholly, but before becoming thoroughly mixed with the main body of steel, the metal sets, leaving streaks. It had been thought that the first metal poured would set and hold the plate at the bottom of the ingot, where it would be sheared off; but as soon as it appeared that the plates caused streaks the practice was promptly stopped. A few similar failures have been noted in rails from other mills, but whether due to a similar cause has not been determined.

Manufacturers' Standard Testing Machine.

"Elongation and Ductility Tests of Rail Sections Under the Manufacturers' Standard Drop-Testing Machine" were reported in a paper prepared by P. H. Dudley, which was read by title in the absence of the author. The decided advantage of the newer method for obtaining elongation was pointed out, as the energy can be concentrated upon the same portion of metal for more than one blow. For this reason the elongation per inch for the second blow is but little less than that for the first, while in the older machines it was only about half as great. The ductility of the metal may also be uniformly exhausted and determined by two, three or more blows. This is impossible with the old type machines, as the best that can be done is a single blow upon the side which would show from 12 to 16 per cent ductility for the maximum inch, though rarely breaking the section. In the new drop-testing machine, the dies of the hammer and of the supports, each have a radius of 5 inches. The supports are set 3 feet apart upon a cast iron block weighing 20,000 pounds, which is supported upon springs to insure that the energy of the blow will be expended principally in deflecting and producing a permanent set in the rail butt under test. In the old style machine, the supports for the butt were arranged on a small foundation and the rebound of a 2,000-pound hammer was as large as 12 to 13 inches, while in the present machine it is confined to three or four inches.

Effect of Titanium on Segregation.

G. B. Waterhouse, of the Lackawanna Steel Co., Buffalo, read a paper on "The Influence of Titanium on Segregation in Bessemer-Rail Steel," which is in part as follows:

Segregation is one of the important questions before the steelmaker. It is therefore natural that for many years it should have engaged the attention of iron and steel metallurgists in different countries, and have given rise to an important literature. The results recently obtained by the author on segregation in acid Bessemer-rail steel point in the same direction as those published in 1905 by Talbot, which showed the important influence of aluminum in greatly retarding segregation in certain cases. In the present instance titanium, when rightly applied in the proper amount, is also found to retard segregation of sulphur, phosphorus and carbon, in what is normally quiet, quick-setting steel. In all commercial steels the bulk of the ingot must be used, and it is believed that the results are of importance, showing as they do one way in which segregation may be considerably controlled.

Results With Ingots.

The ingots used were from an ordinary rail-steel heat and from a heat to which had been added 64 pounds of ferro-titanium, which amounted to only 0.25 per cent of the weight of the

heat. The ordinary steel was made in the usual way. After the heat was turned down, the proper amount of molten spiegel was poured into the vessel. The heat was held there a short time poured into the ladle, and then through a 1½-inch nozzle into the ingot molds.

There were six molds. After three ingots had been poured, a ladle test was taken. The third ingot of the six was allowed to cool while still standing on its stool, and was then cut through longitudinally.

The heat in which ferro-titanium was used was made in exactly the same way. As the steel was poured into the ladle, the alloy was shoveled in; the heat was then held in the ladle for three minutes before pouring the ingots. In this case also, the third ingot of the heat was cooled in an upright position and cut through longitudinally. An analysis of the ferro-titanium follows:

	Per cent.
Carbon	10.50
Titanium	11.60
Iron	74.12
Silicon	1.60
Manganese	0.30
Calcium	Trace

The noticeable feature of these cut ingots was the increased soundness of the titanium steel due to the concentration of the blow-holes in the pipe cavity.

The analyses of the ladle tests from the two heats were as follows:

	Ordinary steel. Per cent.	Titanium steel. Per cent.
Carbon	0.44	0.47
Sulphur	0.98	0.068
Phosphorus	0.088	0.093
Manganese	0.91	0.95
Silicon	0.117	0.118

No trace of titanium will be found in the so-called titanium steel, but it will be so termed for the purpose of distinction. Drillings were taken from the surfaces of the ingots for the sulphur, phosphorus and carbon determination. The results are briefly considered in order:

Sulphur.

This element segregates the most. In the ordinary steel it has risen from 0.098 per cent in the ladle test to a maximum of 0.223, and there is a considerable area with more than 0.147, which is 50 per cent more than the ladle test. In the case of the titanium ingot, the contrast is very remarkable. The greatest result is 0.101, which is not quite 50 per cent more than the ladle test, 0.068, and the segregated area is very much smaller than in the case of the ordinary ingot. It is true that there are two factors which may partly account for this difference in results; the titanium ingot is somewhat smaller, and there is less sulphur in the steel as a whole. The fact remains, however, that there is much less segregation of sulphur in the titanium than in the ordinary steel.

Phosphorus.

In the ordinary steel the phosphorus has risen from 0.088 per cent in the ladle test to a maximum of 0.167, and here also the segregated area is considerable. In the titanium steel the maximum is 0.124, starting with a ladle test of 0.093, and the segregated area is more restricted than in the case of the ordinary steel. The ordinary steel is in a better condition to start with than the titanium steel, as it has slightly less in amount (0.088 as compared with 0.093), so that the behavior of the phosphorus is a good test of the preventive power of the titanium.

Carbon.

Here again the titanium steel shows less segregation than the ordinary steel, and it must be remembered that it starts with 0.47 as compared with 0.44 per cent. The highest results found are 0.67 in the one case and 0.69 in the other, and ordinary steel again has the larger segregated area. The results of the silicon and manganese determinations are not given; they are somewhat erratic in each case, but do not exhibit segregation.

Results With Rails.

It was felt desirable to make careful experiments with the entire length of rails from two ingots, one of ordinary steel and one of titanium steel. Among other reasons, the results given do not represent those of regular practice, in which the ingots are placed in the soaking pits while the interior is still molten, and are rolled when solid throughout. It was thought that in the latter case, where the same opportunity was not given, there would not be found the same amount of segregation. Accordingly, two heats of steel were made as nearly as possible under the same conditions, except that in one case 75 pounds or 0.3 per cent of ferro-titanium was used, and the steel held for three minutes in the ladle before pouring. In each case the third ingot of the heat was taken. The ingots were three-rail length, and the section rolled was the Dudley 100-pound rail. The rails were marked A, B and C, being respectively the top, middle and bottom rails from the ingots.

The drillings for analysis were obtained in the side of the head with a 13/16-in. drill, going well past the center in each case, and to a uniform depth each time. Beginning 2 inches from the top of the A rails, drillings were taken every 12 inches, and in the B and C rails, every 18 inches.

The analyses of the ladle tests of these two heats were as follows:

	Carbon. Per cent.	Sulphur. Per cent.	Phosphorus. Per cent.	Manganese. Per cent.	Silicon. Per cent.
Ordinary steel.	0.49	0.044	0.102	0.92	0.162
Titanium steel.	0.51	0.041	0.102	0.92	0.172

In these rail sections, the use of ferro-titanium greatly lessened segregation. The sulphur in the ordinary steel varied from 0.038 to 0.054 per cent, and in the titanium steel from 0.039 to 0.049. The phosphorus in the ordinary steel varied from 0.084 to 0.114 per cent and in the titanium steel from 0.090 to 0.105. Lastly, the carbon in the ordinary steel varied from 0.46 to 0.56 per cent, but in the titanium steel only from 0.50 to 0.56. The use of the alloy, therefore, has brought about much more uniformity in the steel and has lessened the seggregation.

Discussion of Steel Segregation.

In opening the discussion, Prof. Howe said that there is little segregation in quiet steel, and anything which causes quiet lessens segregation, and anything causing wildness increases segregation. One member was of the opinion that either aluminum or silicon would have produced the same result as obtained from the use of ferro-titanium. Henry Souther called attention to the fact that the metal containing titanium was held in the ladle three minutes, which would result in the rapid chilling of the metal in the ingot, the pouring temperature appearing as important to him in the lessening of segregation as the use of titanium. In reply, Dr. Waterhouse said that it was the practice to pour the steel at the lowest possible temperature, and he admitted that some of the results may have been due to the lowered temperature of the steel when poured into the ingot mold. The steel, he said, was quiet and quick-setting, which condition could be obtained either by the use of titanium or aluminum. Another member pointed out the dangers of chilling by holding steel too long, yet it is desirable to hold it before pouring a sufficient length of time to permit of setting.

Cupro-Nickel Steel.

A paper on "Cupro-Nickel Steel," by G. H. Clamer, contained reports of the surprising results that can be obtained by the joint addition of copper and nickel to steel. It is given in part herewith:

The iron-nickel and iron-copper series of alloys were reviewed at length to show what surprising results are obtained by the joint addition of copper and nickel. Alloys can be produced carrying from 5 to 20 per cent copper, which without nickel would be extremely hard, brittle and red short. By the addition of nickel in the proportions of 20 to 50 per cent these become highly ductile, easily forgeable, and easily machineable. Such alloys can be rolled into sheets or rods and can be machined without difficulty.

The following are tests of two typical alloys within these ranges of proportions:

	No. 1.	No. 2.
Copper, per cent	9.00	19.50
Nickel, per cent	22.00	45.00
Carbon, per cent	0.22	0.2
Ultimate strength, pounds	101 000	98,233
Elastic limit, pounds	57,300	54,150
Elongation, per cent	42.5	35.00
Reduction of area, per cent	61.5	47.9

These tests were made on rolled rods. The elastic limit is quite low in proportion to the ultimate strength,

which naturally accounts for their softness. Alloys at the lower range of the series can be bent cold to an angle of 180 degrees without fracture, whereas those at the higher end of the series cannot be bent so far. Alloys at the lower end of the series will resist corrosion in a highly satisfactory manner, and those at the upper end are practically non-rusting. In addition to this, the alloys have a very low co-efficient of expansion. Just what use such alloys might be put to has not yet been determined, but no doubt quite a number will suggest themselves, such as a substitute for the present 25 to 35 per cent nickel-steels, and probably quite a number of others, because the steel can be produced at a very much lower cost, not only because of the substitution of copper for nickel, but because the alloy can be made from Monel metal, a commercial alloy of copper and nickel, containing copper and nickel in correct proportions for making such a steel. It is also possible to make the steel directly from Sudbury nickel ores, by simply smelting and bessemerizing to eliminate the iron to extent desired, roasting the matte produced, and finally reducing the combined oxides resulting from roasting the matte. It is thought that either by the use of Monel metal for making the steel alloy or by the direct production of it from the ore, that the cost of production might be sufficiently reduced to make it attractive for roofing, gutters, spouts, ventilators, and many other uses where its resistance to corrosion and its low co-efficient of expansion will warrant the cost. Such sheets can be produced to sell at a very much lower price than copper, and probably two to four times the price of commercial coated iron and steel sheets, but as the alloy is about twice as strong as the soft steel and three times as strong as copper sheets, thinner gauges can be used.

Noting the curious and unexpected results obtained with these high copper-nickel alloys. Mr. Clamer became curious to know what would be the effect of replacing part of the nickel in nickel-steel within the pearlitic range by copper, and accordingly made such steels with from 1 to 8 per cent Monel metal, in which the proportion of nickel to copper is roughly 2½ per cent nickel to 1 per cent copper. Here again the copper acts like so much nickel, at least when present in these relative proportions ,and it is possible, therefore, to produce a steel of practically the same physical properties as nickel-steel, at very much reduced cost. In these steels, the nickel, iron and copper are in the same relative proportions in which they exist in some of the prominent mines at Sudbury, where vast deposits exist, average analysis of these ores being as follows:

	Per Cent.
Copper	0.8 to 2.00
Nickel	2.0 to 5.00
Iron	35.0 to 52.00
Sulphur	Balance.
Gangue	Balance.

The valuable properties of the nickel-steel, carrying below 6 per cent nickel, have of course long been recognized and recently the value of copper as a valuable constituent of steel, instead of a metal to be looked upon as a detrimental impurity, has also become recognized. It is probably not quite so surprising therefore that the joint addition of copper and nickel within this range of proportions is productive of valuable results. The addition of these two metals in combination seem to have the same effect upon the steel as if they were individually added, the copper in its effect really being about the same as so much added nickel. It is possible, therefore, to replace part of the nickel in nickel-steel by copper, without materially altering the physical properties.

Copper in Steel.

That copper is a valuable addition to steel instead of being detrimental was also confirmed by John A. Mathews, operating manager of the Halcomb Steel Co., Syracuse, N. Y., in the following discussion of Mr. Clamer's paper:

"The title of Mr. Clamer's paper brought to my mind two thoughts, first, the general subject of copper in steels, and, second, some experiments that we made a year or two ago in connection with a nickel steel containing an unusually great amount of copper. In looking up this subject, I was surprised to find how little attention has been given, in papers and discussions that have been presented to the Society for Testing Materials during the past five or six years, to the general subject of copper in steel. So far as I recall, none of the society's specifications mention copper, however, I find that there is still in the minds of many users of steel a prejudice against copper.

"A year or two ago, we sent a large quantity of steel spring to the Panama canal. Upon its receipt, we were advised that the copper content exceeded the specification and it was reported as being from 0.07 to 0.12 per cent, whereas the specification had stated that the steel was subject to rejection if the copper exceeded 0.05 per cent. Our own analyses confirmed the fact that the copper was higher in the steel than we had expected but the writer looked up the authorities on the subject and presented such an eloquent and convincing brief that not only was the steel accepted but specifications since that time have omitted any reference to the copper content.

"In connection with nickel steel, a firm of automobile manufacturers formerly specified that the copper in their nickel steel should not exceed 0.025 per cent. The writer was instrumental in getting this specification changed so that the user shifted the decimal point for copper one point to the right, making the permissible amount 0.25 per cent, and still later omitted all mention of copper in his specification.

"It is hardly necessary here to review the large number of recent investigations that have been made in connection with this subject as, for example, the articles that have appeared in the *Journal of the Iron and Steel Institute* of late years by Stead, Wigham, Colby, Breuil and others; also, articles by Dillner, Müller and Bischoff, in *Stahl und Eisen,* together with the statements by Harbord, Campbell and Howe in their general treatises on steel. It is, perhaps, a surprise to many to know how generally present copper is in all kinds of steel, even in the best grades of Swedish materials. Bischoff, to whom we have just referred, published the analyses of some 40 or 50 samples of German and Swedish steels, and every one of them contained copper, the amounts varying from mere traces to 0.274 per cent. It is sufficient to say, however, that the general trend of scientific work in connection with the influence of copper on steel has been to show that, in any ordinary quantities in which it is likely to be found, its effect is not marked one way or the other, or may be even beneficial.

Nickel Steel Melted in Electric Furnace.

"The particular experiment in reference to cupro-nickel steel, to which I should like to refer, is of perhaps more than ordinary interest owing to the fact that the heat of nickel steel containing copper was melted in our Heroult electric furnace, and that the pig iron used in this heat was produced in Canada in the Heroult smelting furnaces, which were installed there some years ago. The entire heating from the ore to the finished product was by means of electricity, and this is probably the first heat of steel so made in the United States. The pig iron, as produced from certain of the Canadian ores, carries a considerable amount of nickel and copper and it was with a view to seeing what results could be obtained from this pig iron that we made a heat charging in cold pig and ore into our furnace. The result of this heat gave steel of the following analysis:

	Per cent.
Carbon	0.44
Silicon	0.034
Manganese	0.50
Phosphorus	0.013
Sulphur	0.013
Nickel	3.62
Copper	0.48

"It must be remembered that all the nickel and copper present were contained in the original pig iron used. We had no definite analysis in mind when we started this heat but were more interested in finding what grade of steel

would result from the grade of pig used. The ingots were clean and worked very satisfactorily under the hammer, and the ½ per cent of copper present seems to have exerted no deleterious influence as regards the heating or working.

"For the sake of comparing this steel with another steel of approximately the same analysis but free from copper, we selected an open-hearth nickel steel whose heat analysis was as follows:

	Per cent.
Carbon	0.46
Silicon	0.066
Manganese	0.70
Phosphorus	0.021
Sulphur	0.034
Nickel	3.36

"An examination of this heat showed that it contained about 1-10 of 1 per cent of copper. The physical tests to be mentioned later were made from ⅞ inch diameter round bars and the greatest care was used in their heat treatment. Tests were made in duplicate and the annealing of the bars from the two heats were made at the same time so as to avoid any possible difference in the annealing temperature. It was noted that the open-hearth nickel steel machined a little more freely than the electric furnace nickel steel containing ½ of 1 per cent of copper, but here the superiority ended. The tensile tests of the material as rolled gave us the following figures:

	Open-hearth nickel steel.	Cupro-nickel steel.
Elastic limit, pounds	74,625	72,400
Ultimate strength, pounds	122,000	115,000
Elongation in 2 inches, per cent	16	22
Reduction in area, per cent.	34	51

Annealed Steel.

In the annealed condition the physical tests were as follows:

	Open-hearth nickel steel.	Cupro-nickel steel.
Elastic limit, pounds	64 750	63,750
Tensile strength, pounds	119,000	107,300
Elongation in 2 inches, per cent	17	25
Reduction in area, per cent.	37.5	48

Samples of both steels were heated to 1,500 degrees Fahr., quenched in oil and drawn back to a temperature of 800 degrees Fahr., and maintained at that temperature for 20 minutes. In this condition, the results of physical tests were as follows:

	Open-hearth nickel steel.	Cupro-nickel steel.
Elastic limit, pounds	154,000	154,000
Tensile strength, pounds	175,000	172,500
Elongation in 2 inches, per cent	9.75	13.25
Reduction in area, per cent.	30.8	49.1

"In all the tests above, the elastic limits and tensile strengths are not very different for the two steels, but the very great superiority of the cupro-nickel steel in the elongation and reduction of area is most noticeable. The presence of the copper certainly has not in any way decreased the toughness of the steel, as manifested in its elongation and reduction of area, but the most remarkable difference in the two steels was noticed in samples which had been quenched at 1,500 degrees Fahr. and drawn back to only 600 degrees Fahr. In this condition, both steels showed an elastic limit of about 185,000, with the tensile strength slightly above 200,000 pounds. The open-hearth steel was rendered decidedly brittle by this treatment, only giving 2 per cent elongation and 4 per cent reduction in area, but the electric furnace product gave 12 per cent elongation and 46 per cent reduction in area.

"So far as this single test is concerned, therefore, there is absolutely no evidence to show that the copper has exerted a harmful influence, and we must either ascribe its superiority to the presence of copper, or to the superiority of the electric method of melting, or to both acting jointly.

"From an extended experience with electric furnace product as compared with the open-hearth nickel steels containing carbon verying from 0.10 up to 0.50 per cent, there no longer remains any doubt in my mind as to the superiority of the electric product over open-hearth nickel steel.

"The Heroult furnace with which I have had experience was the first commercial electric furnace installed in the United States, and the result of this experiment, where both the pig iron and the steel were of electric furnace origin, seemed to me of sufficient interest to present to the society."

Copper in Rails.

Capt. Wm. R. Hunt, who was in the chair, said that many years ago, rails made from Cornwall ores contained as high as ½ per cent copper. Rails made with these ores as a basis contained no phosphorus, high copper and incidentally a little sulphur. Capt. Hunt characterized these rails as good rails and expressed a wish that they could be obtained today.

J. V. W. Reynders, Pennsylvania Steel Co., explained that the copper was being taken out of the Cornwall ores, not because the copper is not beneficial, but to recover the price of the copper. He added that he hoped to soon be able to announce the results of a mixture of Cuban iron ore, containing nickel and chromium, with Cornwall ore.

Henry Souther said that notwithstanding the beneficial effects of copper in steel, it is a detriment, especially in tubing that is to be welded. It was added that copper seems to have the same effect on welding as a high percentage of sulphur, and, in fact, steel containing high phosphorus and high sulphur welds better than steel containing copper. One member said that he had successfully welded steel containing carbon 1 per cent and copper ½ per cent, and experienced no more difficulty than when welding ordinary steel. The steel was electrically welded. It was also stated that rails made at Scranton, Pa., from Cornwall ores, 15 years ago, containing 0.6 per cent of copper and carbon 0.40 per cent, are still giving good service.

The results of a test of a structural steel plate which had been partly fused by a short-circuited electric current were presented by A. W. Carpenter, an abstract of which is herewith given:

The electrification of the N. Y. C. & H. R. R. R. out of the Grand Central station, New York City, involved carrying the electric third rail and electric power cables over the steel Park avenue viaduct, about 1¼ miles long. The cables were placed in steel tube conduits just over the tops of the girders on which the conduits were supported on wooden blocking. A short circuit took place which fused the conduit pipe and burned the underlying girder cover plate, the burn extending clear through the plate at one point, which was about the center of the plate. The conduit metal and cable copper were fused into the plate. The injured portion of the plate was cut off and replaced with a new plate properly spliced to the remaining portion on the girder, in due course of repairs. It was thought desirable to determine the extent of the injury to the strength characteristics of the plate due to any possible change in the character of the material; that is, any injury aside from the mere loss of section. The removed portion was, therefore, sent to the Watertown arsenal for tensile tests, and microscopic examinations of the structure of various parts were made.

The conclusion drawn from the tests was that the character of the metal was changed by the electric burning, but that the injury did not extend far beyond the limits of the visible burning. This local change in the character of the metal was enough, however, to reduce the static strength of the plate tested as a whole some 40 per cent and to destroy its ductility; from which it was further concluded:

(1) That a plate with similar injury would be unreliable for service, and

(2) That if the local injury were cut away the balance of the section could be depended upon to develop practically the same unit strength as prior to the injury.

The damage to the plate is considered due to the heat produced, in which electricity was merely the producing agent, and it is thought that a similar amount of heat produced in any other way and applied to the same

parts for the same period of time would have given the same results.

Cold-Drawn Steel.

A progress report was presented by C. E. Skinner, chairman of the committee on standard specifications for cold-drawn steel. Considerable trouble and delay has been experienced in obtaining material, which has greatly interfered with the work of the committee. A special effort will be made to ascertain the requirements of cold-drawn steel for high speed work. Henry Souther stated that he had attempted to measure the machining qualities of cold-drawn steel by the Brinell and Shaw methods, and he was of the opinion that these hardness tests will give the measure of machining qualities.

Preservative Coatings for Iron and Steel.

Reports of the various committees that are conducting experiments to ascertain the most suitable preservative coatings for iron and steel, were presented Thursday afternoon. S. S. Voorhees, chairman of the Committee on Preservative Coatings for Structural Material, briefly outlined the progress of the experiments with 19 different paints, which were applied to various panels on the Havre de Grace bridge several years ago. On May 5, this year, these panels were inspected by the members of the committee, and on the whole, the coatings were found to be in good condition. This was attributed to the careful manner in which the pigments were applied, the surfaces having been first carefully cleaned and the paint was uniformly spread on all the panels. In judging the condition of the various panels, various factors were taken into account, such as chalking, checking, cracking, scaling, the condition of the coating as a whole, etc. None of the coatings were found to have deteriorated sufficiently to enable the committee to formulate a final report, although it was stated that the plates on the Havre de Grace bridge which were not pickled before the paint was applied, were found to be in better condition than the pickled plates. It was explained that pickling removes the hard scale on the surface of the steel, which in itself is a preservative coating and helps to retard corrosion. The Pennsylvania railroad has discontinued pickling plates for steel car work, and instead has substituted the sand blast. This removes the loose scale and oxide, but does not penetrate the hard scale.

Corrosion of Iron and Steel.

The work of the committee on the Corrosion of Iron and Steel, during the past year, as reported by its chairman, A. S. Cushman, consisted in the care and supervision of the wire fence panels at Pittsburg and the official inspection of the steel panels at Atlantic City. A sufficient time has not yet elapsed to justify a definite report on the Pittsburg wire tests, but the result of the inspection of the steel panels exposed at Atlantic City proved exceedingly interesting. Three years ago, the suggestion was made in a paper presented before the Society that the various substances used as pigments in protective coatings might exert a stimulative or an inhibitive action on the tendency to corrosion of the underlying metal. It was further suggested, on theoretical grounds, that slightly soluble chromates should exert a protective action when employed as pigments by maintaining the surface of iron in a passive condition in case water and oxygen penetrated the paint film. In view also of the well-known fact that alkalis inhibit while acids stimulate the corrosion of iron, it was suggested that the action of more or less pure pigments on iron in the presence of water should be thoroughly investigated. Water tests of about 50 pigments, which are in more or less common use for painting steel, were purchased in the open market and distributed among a number of the members of the committee. Each investigator operated independently of the other, but the same general method of conducting the tests was followed. As a result of the tests, the pigments were divided into inhibitors, stimulators and indeterminates. As a result of these preliminary tests, it seemed desirable that a systematic investigation of the same pigments under service condition should be made. The Paint Manufacturers' Association of the United States offered to erect the series of steel panels at Atlantic City, and placed them under the supervision and control of the American Society for Testing Materials.

Inspection of Panels.

The panels were erected in the autumn of 1908, and the first official inspection was made on April 15, this year. A committee of seven inspectors was appointed and each member made an independent inspection. The method of examination adopted was as follows: Each plate was given two separate marks graded upon a scale of 10, one mark was to signify the condition of the plate as far as corrosion effects were discernible, and the other was to grade as nearly as possible the present condition of the protective coating. In judging condition, various factors were taken into account, such as chalking, checking, cracking, scaling and color. It was the unanimous opinion of the inspectors that so little difference existed in the duplicate panels on the different steels and fences that the careful report on one line of panels would answer for all up to the present time.

The committee was unanimously of the opinion that up to the present time no differences are discernible in the duplicate protective coatings applied to different types of steel or to surfaces prepared in different ways. As would be expected, however, the panels which faced the ocean and acted to some extent as a wind break to the other lines, showed slightly advanced deterioration.

Best Pigments.

To make a more thorough inspection of the plates, so that the condition of the surface underneath the paint could be examined, one-half of the film was removed from one panel of each of the six duplicate sets of plates. The results of the examination of the inspectors made independently of each other and then averaged by the chairman, for the pigments that showed a grade of excellence of 800 above, is presented herewith:

Pigment.	Average.
American vermilion (chrome scarlet)	9.8
Chrome green (blue tone)	9.8
Zinc barium chromate	9.7
Sublimed blue lead	9.6
Sublimed white lead	9.5
Zinc lead chromate	9.5
Zinc chromate	9.4
Bright red oxide	9.3
Prussian blue (water stimulative)	9.2
Natural graphite	9.1
Orange mineral (American)	9
Medium chrome yellow	9
White lead (quick process)	8.9
Willow charcoal	8.8
Prussian blue (water inhibitive)	8.8
White lead (Dutch process)	8.7
Red lead	8.7
Zinc lead white	8

Preparation of Plates.

Several hundred plates were obtained for the test and one-half the number were pickled in sulphuric acid, then neutralized with soda ash, thoroughly washed, and preserved from future oxidation in dry lime until needed for the test. The removal of the mill scale was complete in the case of the pickled plates, and a perfectly clean, neutral surface was obtained upon which to apply the paints.

Painting of Plates.

The painting of the plates was done under cover in a temporary building erected for the purpose. This was necessary in order to have uniform conditions for the application of each formula. A definite spreading rate of 900 square feet to the gallon was used on the paints applied to the cleaned plates, while the paint applied to the black plates, that is, those not pickled and having the ordinary black mill scale, had no definite spreading rate. The paint was applied under the constant supervision of the director of

tests, by the painters representing the committee and the Master Painters' Association. Three-coat work was used throughout on the cleaned plates, upon which the original 51 pigments were applied, but in some cases, on the black plates, two-coat work was used.

Exposure Tests of Steel Coatings.

Cloyd M. Chapman, engineer in charge, Westinghouse, Church, Kerr & Co., New York City, presented an exceedingly interesting report on "Some Exposure Tests of Structural Steel Coatings," which is in part as follows:

About 3½ years ago, Westinghouse, Church, Kerr & Co. exposed to the weather on the roof of the building occupied by them at the southern extremity of Manhattan, 24 small steel plates each coated with a so-called steel preservative paint. The great difference soon noted in the protective value of these paints led to the testing of other paints and coatings until some 1,600 plates have been exposed, painted with 530 different coatings submitted by 271 manufacturers or dealers. The results obtained to date are more or less interesting, according to the conclusions which may be drawn from them.

The method employed in most of these tests was as follows: Small samples of the ready mixed paints were submitted by the manufacturer or dealer, together with a statement of the principal ingredients entering into their manufacture. Each paint was applied to two mild steel plates of about No. 16 gage, 2 inches wide and 6 inches long, which had first been well cleaned of oil and foreign matter. One plate was given one coat and the other two coats. Care was taken to give a uniform full coat to both sides and all edges of the plates. After the second coat had dried the plates were fastened to boards and exposed on the roof at an angle of 45 degrees, facing south.

On the day the plates were exposed scratch marks were made with a sharp instrument across two opposite corners of each plate. These scratch marks cut through the paint film, leaving bright metal exposed so that rust could and did start immediately along these lines.

At regular intervals after exposure each plate was examined and a record made of its condition. The one quality which was being sought and the prime factor which entered into the rating of the paints was—protection against rust.

Scale of Ratings.

An arbitrary scale of ratings was adopted based on the amount of rust apparent on the plate. Until some small spot of rust appeared the plate was rated at 100 per cent, except cases of fading, allegatoring, bad chalking, etc., without any rust apparent, which were rated at 97 per cent. When one small spot of rust, the size of a pinhead, appeared, the plate was rated at 90 per cent. When several such spots or one larger spot of rust appeared, the plate was rated at 85 per cent. When the sum of the areas of the rust spots totaled an area of about ¼ inch square, the plate was rated at 80 per cent, when ½ inch square, at 75 per cent. When the combined area of rust spots totaled about one square inch, the plate was rated at 70 per cent, and so on down the scale until zero rating indicates the plate entirely rusted on the exposed side.

The scratch marks across the corners of the plates developed some interesting results by showing the relative resistance offered by the various coatings to the spread of the rust which got its start where the bright metal was exposed.

Another interesting and somewhat curious fact has been noted in these tests. It is that the various classes of pigments fail in characteristic manners. A plate coated with a graphite paint does not rust in the same manner as one coated with red lead or an iron oxide.

As the test plates were exposed from time to time throughout the year in lots of about 200, it would not be fair to compare the three or six months rating of a paint exposed in June with the corresponding rating of one exposed in November, after the one had been subjected to warm, dry weather, and the other to an equal period of cold, rain and snow. For this reason, the one-year and two-year ratings are compared in all cases, so that all have been exposed to the four seasons in succession one or more times.

Classification of Pigments.

As noted above, each manufacturer was asked to state the principal ingredients in his paint, and on the basis of these statements the samples were classified into groups depending upon its chief pigment, or, in the absence of pigments, upon its vehicle. In this way the paints were divided into a number of classes, as follows:

Carbons.

In this class are grouped the natural and artificial carbons except graphite.

Graphites.

This class contains both the natural and artificial graphites.

Iron Oxides.

These also include both the natural and artificial pigments, some of which were received in paste or dry form to which pure linseed oil was added.

Red Leads.

This class includes both the straight red lead and oil mixed in the laboratory shortly before applying, and the ready mixed red lead paints which contain considerable percentages of other pigments to keep the lead in suspension. These red leads had no other coating over them.

Red Lead Primers.

These consist of tests in which the first coat was a red lead paint, either "ready mixed" or straight red lead and oil, while the second coat was of some other class. Of course, no one-coat tests could be made in this way. The second coats in this class were of widely different varieties.

White Leads.

This class is rather surprisingly small and is made up largely of paints mixed from the paste in our own laboratory.

Zinc Oxides.

Few makers put out a zinc oxide paint for structural steel.

Mineral Hydrocarbons Without Pigments.

This class is composed of paints made of the various kinds of tars and tarry refuse, and the various minerals of an asphaltic nature, gilsonite, elaterite, etc., but without any pigments added to them. They form one of the more numerous groups and as a rule are much lower priced than the oil paints. They also form the class for which the greatest merit is usually claimed by the makers and agents.

Mineral Hydrocarbons With Pigments.

This class is made up of the same character of materials as the last, but with various pigments added. For instance, a paint made of gas tar and iron oxide would fall in this class rather than in the iron oxide class.

Vegetable Hydrocarbons With and Without Pigments.

This class includes distillates and residual pitches of vegetable oils, etc. They are not numerous enough to divide into two groups, hence those with and those without pigments are placed in the one class.

Cements.

Several manufacturers have acted upon the frequently published statement that Portland cement offers a protection to steel against rust, and have put out a paint said to be made up largely of cement. These paints are grouped in a class by themselves. As they have appeared in the market mostly within the past two years, only one of them has had a full two years' exposure.

Chromates.

Another effect of recent paint literature has been to cause the appearance of a number of paints said to contain chromates or chromic acid in some form. Some of those have appeared within the past year and no tests of those can be included in this paper.

Vehicles.

This class contains the oils, varnishes and transparent coatings containing little or no pigment, but which are more or less used for the protection of steel.

Miscellaneous.

Into this class are grouped all the coatings which do not fall into one of the above groups or concerning which

the maker refused proper information to enable the paint to be classified. Other subdivisions were made in our laboratory records, but they each contained so few representatives that they were all thrown into this miscellaneous class for purposes of comparison in this paper.

Summary of Results.

In the following table is given a summary of the results obtained with each class of paints for one and two-year exposures of one and two-coat specimens. This table also gives in each case the number of tests which entered into each result:

TABLE OF RESULTS OF EXPOSURE TESTS OF STRUCTURAL STEEL PAINTS.

Class.	One year exposure—One coat. No. of tests.	One year exposure—One coat. Av. rtg. Per cent.	One year exposure—Two coats. No. of tests.	One year exposure—Two coats. Av. rtg. Per cent.	Two years exposure—One coat. No. of tests.	Two years exposure—One coat. Av. rtg. Per cent.	Two years exposure—Two coats. No. of tests.	Two years exposure—Two coats. Av. rtg. Per cent.
Carbons	65	21	54	70	34	2	36	46
Graphites	67	18	56	66	42	3	43	45
Iron oxides	74	35	71	69	52	10	52	46
Red leads	50	58	39	77	19	16	20	61
Red lead primers	0	..	43	75	0	..	14	56
White leads	23	51	11	82	3	0	3	25
Zinc oxides	5	25	5	69	5	3	5	50
Mineral hydro-carbons without pigments	66	20	73	46	36	0	37	18
Mineral hydro-carbons with pigments	10	16	11	53	7	0	7	20
Vegetable hydro-carbons with and without pigments	13	19	13	57	3	0	3	5
Cements	7	36	7	46	1	0	1	0
Chromates	14	32	24	70	9	0	9	39
Vehicles	22	8	7	11	3	0	3	0
Miscellaneous	94	28	103	67	70	7	85	39

Coating for Cement and Concrete.

Charles Mac Nichol presented a paper entitled "The Painting of Cement and Concrete Structures," in which he gave a preparation for coating cement and concrete that would prevent the discoloration of paint subsequently applied. The mixture consists of one-half zinc sulphate and one-half water, by weight, which is applied to the cement or concrete surface and is permitted to dry from 48 to 72 hours before spreading the paint over the surface. It was stated that after cement or concrete is given this prime coating, the most delicate tints of paint can be applied without danger of discoloration.

Other Committee Reports.

The committee on linseed oil reported that boiled oil specifications are to be drawn and the terms used in paint specifications are to be defined. An investigation of the effect of pigments on corrosion is also being made, ten pigments having been selected for this purpose. The appointment of a committee on accelerator tests was recommended so that rapid results could be obtained which would be comparable with service tests of paints. The committee on standard specifications for varnish reported progress. It was also announced that the committee appointed to investigate white paints is formulating a general plan of pigment combination.

Tests of Metals for Hardness.

A paper, prepared by A. F. Shore, entitled "The Scleroscope," read Friday morning, precipitated a lengthy discussion on tests of metals for hardness, which developed many valuable points regarding the various methods and machines in use for making hardness tests. The scleroscope is an American invention, used widely all over the world, yet the question has been raised recently as to the kind of hardness these various devices measure. Regarding the influence of hardness in cutting metals, Mr. Shore stated "that in metals whose hardness is strictly of chemical origin or basis, the resistance to machining and the effect of tool wear is dependent mainly on three properties, as abrasion, basic hardness and the amount of super-hardening in addition due to cutting pressures, and toughness. The latter, however, is usually greater, as the difference between the basic hardness and the super-hardness, due to cold compression, is greater. In illustrating the meaning of this, copper in its natural condition is about 6 hard by the scleroscope, but after hammering cold, this will increase to over 20 hard, while cast iron 40 hard may show an increase of only five degrees in hardness, and hence is not regarded as tough."

In discussing the various methods of testing, the property of measuring the abrasive increment was assigned to the sclerometer. The ball test measures resistance to penetration under a constant pressure, while the scleroscope measures resistance to penetration under shock. In addition there is a dull test for hardness. It was asserted that the consensus of opinion was strongly in support of the existence of only one kind of physical hardness, in spite of the fact that the pioneer writers of a few years ago claimed that there a definite number of them. The various devices and methods of testing for hardness were described and compared, and the author directed attention to the need of a more universal standard method of expressing hardness.

In opening the discussion, Prof. Howe said that the wonderful resistance to abrasion of manganese steel led to its use for rails, and then it was suggested that if manganese steel was good for rails it should similarly resist abrasion equally as well in car wheels. Tests of manganese steel car wheels were unsatisfactory, as the wheels wore out rapidly. Why the manganese steel rails did not similarly wear out is one of the mysteries that is difficult to understand. Another speaker doubted whether one test for hardness would answer all purposes.

Relative Value of Hardness Tests.

Under the auspices of the United States bureau of standards, Washington, D. C., a series of tests for hardness of metals is being conducted by five different methods and devices. The purpose of these tests is to ascertain whether these devices actually record the same physical property of the metals tested, or whether they record the different kinds of hardness which are claimed by some engineers to exist. Tests thus far made included the use of the scleroscope and the Brinell ball-testing device. Tests were made on tool steel, cast iron, copper-tin alloys, copper, etc.

In view of the different standards of measurement the results are not comparable, as the scleroscope values give the height of rebound, and the Brinell ball test shows the amount of penetration. The results of the tests thus far made are given below:

Material.	Scleroscope.	Brinell.
Tool steel	86.1	641.0
Manganese steel	29.5	179.0
Cast iron, No. 1	33.3	149.0
Cast iron, No. 2	32.9	172.0
Bessemer steel	26.6	185.0
High carbon steel	37.8	289.0
Copper-tin alloy, No. 1	42.4	110.0
Copper-tin alloy, No. 2	25.5	100.5
Copper-tin alloy, No. 3	22.1	94.7
Copper	15.0	88.5
Silicon steel	33.6	262.0

For the purpose of comparing the tests by the two machines, it has been tentatively suggested that the Brinell records be divided by 6 and the results compared with the scleroscope measurements. In the case of tool steel the result is 86.1 hard by scleroscope against 106.8 by Brinell; on manganese steel the results are nearly equal, 29.5 and 29.8; cast iron No. 1, 33.3 and 24.8; cast iron No. 2, 32.9 and 28.6; Bessemer steel, 26.6 and 30.8; high carbon steel, 37.8 and 48.1. In the copper-tin alloys the widest dis-

crepancies are shown as follows: No. 1, 42.4 and 18.3; No. 2, 25.5 and 16.7; No. 3, 22.1 and 15.8. Practically no difference is shown in the hardness tests on copper, the scleroscope showing it to be 15 hard as against 14.9, Brinell. Silicon steel gives the following results: 33.6 and 43.6. By this method of calculation these tests show a considerable variation, which is pronounced in the case of the non-ferrous alloys, and which was contended by one of the members would be the result, as both machines record different kinds of hardness of these alloys.

Shop Tests for Hardness.

Bradley Stoughton was of the opinion that no single hardness test is suitable for all metals. These tests are comparatively even and many variations in results have been due to their improper application. He stated that many works still have their own methods for measuring hardness, including the use of the file, the weighted punch, the sclerometer, the Brinell test, Kreep's drill test and modification, the scleroscope, etc. The Brinell method, he added, is extensively used, and the relation of this test of hardness to the elastic limit and other properties has been calculated. The scleroscope is the quickest to give results, and Mr. Stoughton pointed out that it is particularly satisfactory for measuring the hardness of cold rolled material, for determining the temper and the shape of tool to use to obtain the maximum cutting speed. Furthermore, the scleroscope is adapted for testing tempered steel, whereas the Brinell test would spoil the material for later use. On the other hand, the speaker was of the opinion that the scleroscope was adapted to testing case-hardened gears for automobiles, as it will give only the skin hardness of the gears, which in the case of motor car gears is very thin. For this test the Brinell method is preferred. Similarly the Brinell method is preferred for hardness tests of dies, as many fail in service because the metal backing the hardened surface is not sufficiently hard. In Germany, rails are being tested for hardness by the Brinell method. The testing of bearing metals, Mr. Stoughton added, presented complex difficulties, owing to the existence of hard crystals in a soft matrix, the hard crystals supporting the axle. The scleroscope, he believed, could be fitted with a microscope to test separately the hard crystals as well as the soft matrix. In concluding his discussion, Mr. Stoughton recommended the appointment of a committee to investigate the methods in use for making tests for hardness of metals.

Testing Machines and Apparatus.

Other papers read at this session included a description of the 600,000-pound testing machine of the University of Wisconsin, prepared by H. F. Moore and M. O. Withey, and "Some Testing Laboratory Accessories," by J. Madison Porter. A paper entitled "Apparatus for the Microscopical Examination of Metals," by Albert Sauveur, traced the development of the application of the microscope to the examination of metals.

The Society's Tribute to Dr. Dudley.

Let us record at once our deep grief and our deeper gratitude, our grief indeed at the loss of a great leader and dear friend, but above all, our gratitude that we have had the privilege of being led.

Such measure of usefulness as our society has had it owes in very large part to that leadership. Here was a most rare combination of qualities, the sterling, the intellectual, the human, the judicial, each on a high level, all combining to form a character, a personality, whose like we shall not look upon again.

With a clear head to see the world's needs, to part the essential from the accidental and the merely concomitant, went the skillful and persuasive tongue to make clear to the rest of us what he had first made so clear to himself. With these went the perfect fearlessness, apparently even the unconsciousness of either danger or fear, which made him lead on where others would have flinched. With these again went his calm, clear, good judgment, which seemed to tell him spontaneously which among the good things that needed doing were the most worthy of being done, and what were the best and surest ways of doing them.

With all these admirable qualities went that which was necessary to the accomplishment of his high purposes, his kindness of heart, his sympathy and his tact, which made us all his allies in what he undertook. Had he a proposal? Our affection and veneration for him made us almost its advocates before it was unfolded. Its intrinsic wisdom, and the clearness with which he expressed it, found an audience ready, almost anxious, and certainly expecting to be convinced.

Great as were his tangible works, his greatest was the imponderable. Standing on a high platform, his call raised us towards his level, all the more effectively because of his complete unconsciousness of his own height. We who have known and loved him are for that knowledge and that love the better and the higher—how much, ah, who shall say?

Cement and Concrete.

The meeting of the cement section was held Thursday morning, and bitumens, waterproofing materials, etc., were discussed Friday afternoon. The last session Saturday morning was devoted to the presentation of papers and committee reports on road materials, structural timber, cement sewer pipe, etc.

Memorial Session.

The memorial session in honor of the memory of Charles B. Dudley, late president of the International Association of Testing Materials and of the American Society for Testing Materials, held at the Hotel Traymore, Wednesday evening, was a fitting tribute to the life-work of this great scientist. The meeting was unique and has probably never before been paralleled in the annals of the technical societies of the United States. Eloquent tributes to Dr. Dudley were spoken not only by the members of the Society, which owes its rapid growth to his untiring energy, but by citizens of his home city—Altoona, Pa., —who came in personal contact with him almost daily, not only in the routine of his work, but were also associated with him in promoting the welfare of the citizens of the town, where he resided for more than a quarter of a century.

An opening word on behalf of the executive committee was said by R. W. Lesley, vice president of the society, and the following tributes were spoken in order: "As a Railroad Man," Theodore N. Ely, chief engineer of motive power, Pennsylvania Railroad Co.; "As a Chemist," Edgar F. Smith, vice provost of the University of Pennsylvania and past president of the American Chemical Society; "As a Metallurgist," Henry M. Howe, professor of metallurgy, Columbia University; "As a Mentor," B. W. Dunn, chief of the Bureau for the Safe Transportation of Explosives, under the auspices of the American Railway Association; "As a citizen," W. H. Schwartz, editor *Altoona Tribune*, and "A Personal Tribute," R. W. Hunt, Robert W. Hunt Co.

The exercises closed with the reading of the accompanying tribute, which was adopted by the society.

ADDITIONAL FREIGHT CARS PLANNED BY RAILROADS.

The Delaware & Hudson is planning the construction of 200 composite, hopper-bottom gondola freight cars at its own shops at Oneonta, N. Y. The company is now in the market for the steel underframes for these cars. The Carolina, Clinchfield & Ohio railroad has entered the market for 250 box cars and 100 stock cars. The large assortment of freight cars being tentatively figured upon by the Hawley system is still pending and has not yet reached the definite stage where it would warrant the expectation that the order would be placed in the very near future.

BOTH ORES PAY

Duties According to United States Appraisers in Lead-Zinc Dispute.

The protests of the Consolidated Kansas City Smelting & Refining Co. have been overruled by the board of United States general appraisers which has decided that ores carrying both zinc and lead are not only dutiable on the lead but also on the zinc content as assessed by the collector under paragraphs 181 and 193. The importers had claimed that only paragraph 181 applied, and that the zinc assessment under paragraph 193 was an error. In overruling the claims of the importers, General Appraiser Fischer said:

If it be seriously urged that ores cannot be separated for the purpose of classification then it is true that as zinc-bearing ores containing less than 10 per cent of zinc are provided for free of duty under paragraph 193, the lead content of such ores would escape the duty provided for under paragraph 181. In our opinion, it would be error to hold to this effect. The duty is assessable on the lead or the zinc, or both as the case may be, irrespective of the classification of the remaining constituents of such ores under other paragraphs.

As well may be said that as silver ores are provided for free of duty, it is permissible to ignore the lead content when present in such ore. An examination of the amount of lead and zinc in the respective shipments shows at a glance the varying proportions and the substantial amounts of both metals present in the importations. We are not persuaded that either of such metals should be ignored for classification purposes.

STEEL TIE PLANT PLACED IN OPERATION.

The Steel Tie & Mfg. Co., Newark, O., last week began to operate its new plant equipped by the Osborn & Sexton Co., of Columbus, and is turning out 500 ties per day. Its output will be increased as soon as new equipment can be placed in operation. The company has been organized with the following officers: President and general manager, T. J. Costello, formerly general manager of the Buckeye Rolling Mill; vice president, J. W. Blower, of Columbus, general manager of the Hislyvania Coal Co.; secretary and treasurer, L. B. Richards, Newark, O., president of the Standard Rail Co. The steel ties are manufactured under Mr. Blower's patent, and have been thoroughly tried out in several of the coal mines of the state, proving even more satisfactory than was expected. For the time being, the factory will be kept busy exclusively on ties for mines and industrial plants, as enough orders have been received to keep running on the light ties for several months.

EFFORTS TO RE-ORGANIZE THE PRODUCTS COMPANY.

In an effort to re-organize the Iron & Steel Products Co., controlling various rolling mill and chain plants in eastern Pennsylvania and at Baltimore, the creditors have named a committee consisting of Elverton R. Chapman, Gustave Benjamin and Jacob M. Shenk. All the plants of the company are now closed, two receivers having been appointed by the federal court at Philadelphia. A petition in bankruptcy has been filed in Maryland, where also a receiver has been asked for. The committee has outlined a plan of re-organization which has been submitted to the various creditors. At a meeting recently of creditors of the Canton Iron & Steel Co., the Maryland subsidiary, O. Parker Baker was elected trustee in bankruptcy.

BOUNTY PAYING

Will be Stopped by Canadian Government at Close of This Year.

Washington, July 2.

Reference to the efforts which have been made by the Canadian government to encourage the production of iron and steel in that country is made in a report which is received at the bureau of manufactures. It is stated that the Canadian payments of iron and steel bounties will cease at the close of the present year.

The report gives the following facts as to the payment of these bounties by the Canadian government, during the fiscal year which ended March 10 last:

On pig iron, $573,968, showing a total production of 740,244 tons, of which 547,063 tons were made from Canadian ore, on which a bounty of $480,763 was paid, and 193,181 tons from foreign ore, the bounty paid being $93,205; steel, $695,762 bounty on a production of 740,390 tons; wire rods, $538,812 bounty for an output of 89,802 tons; total bounties paid, $1,808,542. It is considered that the iron and steel industries are now sufficiently established in Canada to be successfully maintained without further bounties, and the minister of finance has indicated that the steel and pig iron bounties will cease on Dec. 31 next. These bounties have now been in force 14 years and during that period amounted to $14,000,000.

NEW CAR SHOP

Contract Let by Western Pacific—Will Build Warehouse.

San Francisco, June 30.

The Western Pacific Co. has awarded a contract to an architect in Sacramento to erect the first of the Western Pacific shops in the State Capital. The Jeffreys shop building, 138 by 221 feet, will be used as a machine, airbrake and tin shop. The preliminary work on the grounds is done, and construction work is to be rushed with all possible speed. Contracts for erecting various other buildings which will make up the Western Pacific shops, will be let as fast as the plans, which are being drawn, can be completed. The city of Sacramento has donated to the Western Pacific a tract of land for its shops which is 1,000 by 4,000 feet, and admirably located.

The Deere Implement Co. has acquired three parcels of land aggregating 137.6 x 275 feet, running through from Brannan to Bluxome street, near the railroad depot, and will erect thereon a large five-story warehouse, to be used as a distributing plant for that firm, doing an extensive business on this coast and with trans-Pacific countries, for which San Francisco is the distributing point.

PREPARING TO RECEIVE AMERICAN ENGINEERS.

Birmingham, Eng., June 20.

Extensive preparations are being made in Birmingham for the visit next month of the American Society of Mechanical Engineers, and it is being looked forward to locally as the principal industrial event of the year. A few days ago, the lord mayor of Birmingham, W. H. Bowater, chairman of the reception committee, issued a letter to the people of Birmingham, pointing out that over 150 members of the American Society of Mechanical Engineers, accompanied by a number of ladies, will attend the meeting. Among other things he said:

Bearing in mind the fact that the English Institution of Mechanical Engineers were entertained in the most complete manner during their recent visit to the United States, we feel that the inhabitants of Birmingham and district would like to extend to these American visitors every possible hospitality during their visit.

The Illinois Steel Co. blew out these stacks in June: South Works No. 2, on the 22d; Joliet No. 1, on the 30th, and Gary No. 11, on the 18th, and No. 6, on July 1.

NEWS FROM MANY INDUSTRIES

(In order to assist the post offices in delivering letters to new concerns, it is suggested that the names of incorporators be written in the lower left hand part of every envelope addressed to such new companies.)

New Buyers:—

The followig manufacturing companies have filed articles of incorporation:

Ashland Iron & Metal Co., Ashland, O.; $1,000; by A. Zalalanek and others.

The Cleburne Foundry Co., Cleburne, Tex.; $35,000; by H. S. Wilson, C. W. Preech and W. A. McDonald.

Boulevard Engine Co., St. Louis, Mo.; $10,000; by Howard G. Gentry, M. A. Brown, B. S. Winston and others.

The Cuyahoga Nut & Bolt Works Co., Cleveland; $10,000; by F. McHale, F. DeEds, A. B. Spurney and W. T. Black.

The Smith-Matthews Foundry, Detroit; $10,000; by Harry A. Smith, Robert Smith, Edward J. Matthews, Detroit.

The Weaver Mfg. Co., Springfield, Ill.; $15,000; tools and machinery; by I. A. Weaver, G. E. Weaver and Edna Weaver.

The Manatawny Bessemer Ore Co., Camden, N. J.; $125,000; by F. R. Hansell, George H. B. Martin, William F. Eidell.

The Copper Clad Malleable Range Co., Omaha, Neb.; stoves and ranges; $50,000; by Lloyd Scruggs, C. R. Binns and Howard B. Graham.

The Reliance Engineering & Mfg. Co., Chicago; gas supplies; $100,000; by William A. Baehr, Thomas J. Lucas, L. Clawson and W. L. Clawson, all of Chicago.

Southern Mfg. Co., Columbus, Miss.; $75,000; agricultural implements, machinery, etc.; by W. W. Craig, of Columbus, Miss.; John F. Elder, of Columbus, O., and Thomas Lundergan, of Marion, O.

New Construction:—

The Link Belt Co., Indianapolis, has been granted a permit to erect a 3-story brick factory building at its plant on West Michigan street, to cost $41,000.

The Dean Drop Forge Co., of Massachusetts, is constructing a factory of brick, steel and concrete at an industrial suburb of Muncie, Ind., which is estimated to cost when completed, about $100,000.

The American Ship Building Co. is building a forge shop at its Lorain, O., plant. The shop will be 60 x 200 feet, of concrete and steel. At one end of the shop will be placed a 4,500-pound hammer for heavy forging work.

The figures for the proposed foundry building to be erected at Charleston, W. Va., for the Baldwin Forging & Tool Co., of Columbus, O., are being revised by Architect Frank L. Packard, of Columbus. The new figures will be ready for bidders in a couple of weeks.

The Caldwell-Watson Foundry & Machine Co., Birmingham, Ala., is planning to raze its present foundry and replace it with a steel and reinforced concrete structure, estimated to cost $25,000. Electrical equipment will be used throughout, and electric cranes will be used for handling heavy material.

G. T. Eames, formerly manufacturer of the Yankee twist drill grinder, advises that he will establish a plant in Kalamazoo, Mich., in the same factory in which the grinders formerly were made and will manufacture a new mandrel press, containing new features. He also will manufacture a line of drill presses and, later, a line of general emery-wheel-grinding machinery.

The Ducktown Sulphur, Copper & Iron Co., Isabella, Tenn., has installed apparatus for the purpose of changing its power system from a direct, to an alternating current, 440-volt, three-phase, 60-cycle system, at an estimated cost of $50,000. The equipment includes two 625-kilo-volt-amperes Westinghouse-Parsons steam turbines, with direct connected generator; and approximately 1,000 horsepower in motors.

The Union Drawn Steel Co., Beaver Falls, Pa., has completed remodeling a former power house into plant No. 3 and has placed it in operation. The work of rebuilding the portion of the works destroyed by fire several months ago is being rushed with all possible speed. The new building will be 250 x 375 feet, two stories and finished basement, of brick and concrete. The equipment is planned to be the most modern and complete.

General Industrial:—

The Niles Forge & Mfg. Co., Niles, O., has increased its capital stock from $20,000 to $30,000.

The Watt Mining Car Wheel Co., Barnesville, O., has increased its capital stock from $75,000 to $125,000.

The Illinois Bolt, Nut & Forging Co., Chicago, has increased its capital stock from $25,000 to $35,000.

Grant Bros. Foundry Co., Detroit, has increased its capital stock from $5,000 to $7,000.

The Dahlstrom Metallic Door Co., Jamestown, N. Y., has increased its capital stock from $150,000 to $1,000,000.

Crane Iron Works, Catasauqua, Pa., has been closed indefinitely following a strike declaration when refusal was made of an unreasonable wage demand from 25 engineers.

Final adjustment has been made of the affairs of the Elmira Steel Co., Elmira, N. Y., by the creditors, a dividend of 20 per cent being paid on all claims on which a dividend had not been paid.

The Slater, Marsden & Whittemore Co., Beloit, Wis., which was recently incorporated, has succeeded a firm which formerly did business under the name of Slater & Marsden. It will add a line of punches and shears to its manufacturing products.

J. H. Krause has purchased the interest of his partner, George Rubin, in the business of Rubin & Krause, Rockford, Ill., scrap iron and metals, and will continue the business on the same basis as in the past under the firm name of J. H. Krause.

The Kansas Zinc Co. of Iola, Kans., with chief works at Altoona, Pa., has been incorporated with a capital stock of $500,000, by George E. Nicholson, of Kansas City; George L. Edwards, E. J. Mudd, J. G. Matthews and John M. Gamble, all of St. Louis.

The Riverdale Iron & Steel Co., Chicago, through its president, Edmund Fordtran, has filed a trust deed to secure a loan of $75,000 for the purpose of refunding outstanding obligations and to carry out plans for plant addition.

The Everlasting Steel Co., with a capital stock of $200,000, has been incorporated at Dover, Del., by Ezra C. Blair, John T. McGovern and James C. Gregg, all of New York. The articles of incorporation empower

the concern to manufacture various articles from iron and steel.

The South Chicago Architectural Iron Works has been incorporated with a capital stock of $10,000, to do a general iron, steel, cement and concrete construction business. The incorporators are Thomas J. Peden, 59 Park street, Roy C. Merrick, and F. B. Laurie, all of Chicago.

The plant known for years as the Means Foundry & Machine Works, Steubenville, O., has been abandoned by its owners, and is being dismantled in order to permit the removal of machinery and other equipment to Toronto, O., where the company's new plant will soon be operating.

The car wheel department which was recently added to the plant of the Enterprise Foundry & Machine Works, Bristol, Tenn., has just cast its first standard car wheels with excellent results. The department is in charge of Asa W. Whitney. Recently, the capital stock of the company was materially increased.

The United States Radiator Co., which was recently organized with a capital of $8,000,000 to take over various plants in this line of manufacture, has elected the following officers: President, Robert J. Gross, Dunkirk, N. Y.; treasurer, H. T. Cole, Detroit, Mich.; vice president and general manager, J. J. Blackmore, New York.

The Kelly-Atkinson Construction Co., Chicago, advises that the building which it will erect at Rondout, Ill., will be used mainly for a warehouse, where it will store material and outfits when not in use. The company will also make a few tools there for its own use, but the plant is not to be a fabricating plant.

Unless exceptions are filed, the first and partial account of Receiver C. C. Murray of the Shenango Iron & Steel Co., Wheatland, Pa., will be confirmed by the federal district court at Pittsburg, on July 9. In it the receiver charges himself with assets, exclusive of real estate, aggregating $35,261.13, and a like amount for expenses and disbursements.

The Zinns Iron Mining Co., which holds large tracts in several counties in Virginia, recently elected the following officers at its first annual meeting, held at Washington, Pa.: President, F. E. Zinns; vice president, T. W. Minton; secretary and treasurer, W. G. Potter. The directors include the officers, T. J. Wisecarver and J. A. Knox, both of Waynesburg, Pa.

The Association Foundry Mfg. Co., Waterloo, Ia., whose incorporation was recently noted, has taken over the foundry formerly belonging to the Waterloo Gasoline Engine Co., and is building a large addition, nearly doubling the space. It has already a number of contracts on its books for furnishing castings to various gasoline engine concerns in Waterloo.

At the annual meeting of the stockholders of the Vulcan Iron Works Co., Mason City, Ia., the following board of directors was elected: Ira Knapp, F. W. Wheeler, A. T. Parker, A. H. Cummings, John Taylor, H. Nelson, John W. Whitesell. The directors organized by electing Mr. Knapp president and general manager, Mr. Cummings vice president and Mr. Wheeler secretary and treasurer.

The Balance Gear Light Vehicle Co., 132 Nassau street, New York City, has incorporated at Albany, N. Y., with a capital of $30,000. The incorporators are W. E. McDonald, New York; Thos. Spalding, Long Island City, and Michael J. McDonald, Far Rockaway, L. I. The company will manufacture a seven and one-half horsepower electric tricycle for city and suburban delivery service, with a charge capacity of 40 miles.

The mill machinery, including rolls, open-hearth equipment, lathes, engines, etc., installed by the Ironton Steel Co. in a proposed plant built 18 years ago at Ironton, a suburb of Duluth, has been purchased by the Duluth Iron & Metal Co. Some time ago the 20 acres surrounding the plant were sold for building lots. The plate and structural mill had just been constructed and the equipment partially placed when the panic of 1892-3 closed it down forever.

The Jewell Steel & Malleable Co., Buffalo, whose incorporation was recently noted, advises that it has been organized for the manufacture of malleable iron and small semi-steel castings. W. E. Jewell, president, has been superintendent of the Acme Steel & Malleable Iron Works for a number of years. A. H. Valentine, secretary and treasurer, has been traveling representative for some years. The Jewell company proposes to build one 15-ton melting furnace and four annealing ovens. The greater part of its equipment has been purchased.

The Foster Gear Co., whose incorporation was recently noted, was organized for the purpose of taking over the business of the Columbus Screw & Machine Co., Columbus, O., to manufacture and put on the market steering gears that it has designed. Because of inability to fill its increasing orders from the old shop, it will put up an additional building, 60 x 100 feet, of brick, at once, and will add considerably to the machinery equpment, including gear hobbing machines and worm threading machines. The company is now operating under the new name and expects to begin building within the next 30 days.

The new iron ore dock of the Chicago & Northwestern railroad at Escanaba was completed, June 23, and the first ore was dumped into it on that day. The dock is the longest structure of its kind on the great lakes, and has a capacity of 90,000 tons of ore. Under the contract with the railroad, the builders were to complete it and turn it over the first of July, but they succeeded in finishing the job a full week ahead of contract time. It is expected that shipping from the dock will begin shortly.

As a result of the success that has been met with in the manufacture of manganese steel crossings, frogs, switches, etc., for steam and electric railroads, also miscellaneous steel, the St. Louis Steel Foundry, owned and operated by Curtis & Co. Mfg. Co., of St. Louis, has been compelled to make extensive additions to its steel plant. The additions have just been completed and additional crane and grinding equipment have been installed. The additions have added about 100 per cent to the floor space and place the company in much better position to take care of and make early delivery on excess tonnage.

Trade Notes:—

The firm of Gordon F. Daggett, 515 Peyton building, Spokane, has changed its name to Daggett & Jacobsen, engineers. The new company will occupy the same offices.

Bernard Grosberg, formerly with the Consolidated Rail & Steel Co., has opened an office in the Central National Bank building, room 1114, Seventh and Olive streets, St. Louis, confining his attention to scrap iron, metals and old railway supplies.

C. W. Hunt Co., New York, builder of coal handling, conveying and hoisting machinery, has opened offices in the State Bank building, Richmond, Va., and also at 607 Rhodes building, Atlanta, Ga., with W. F. Lee, for several years preliminary engineer to the company, in supervision.

Fires:—

The Peterler Car Works, Minneapolis, was saved from a threatening fire June 20 by active work of city firemen. The blaze, which started in the engine room, caused a loss estimated at $3,000, covered by insurance.